# The role of an ICT change agent in ICT diffusion within technology projects in public and private sector settings

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## COMMENTARY ON THE PROFESSIONAL DOCTORATE PORTFOLIO

The professional doctorate portfolio consists of two distinct documents, namely "Advanced Study Units" and "Research Component". The document entitled "Advanced Study Units" integrates the advanced study reports and assignments which were produced in the four units of coursework. The advanced study units were undertaken at the beginning of the Doctor of Business Administration program and laid the foundation for this "Research Component" document.

This "Research Component" comprises approximately a 60,000 word thesis entitled "The role of an ICT change agent in ICT diffusion within technology projects in public and private sector settings" which investigates the three main research questions. The "Research Component" is compiled as a thesis because the research into these questions had an overall single unified methodology. This includes a systematic line of enquiry and four thematically linked case studies with a strong recognised evidence base. Furthermore, the critical commentary of my supervisors and other academics led to the refinement of this document a great number of times which resulted in a detailed discourse on the subject. In addition, the university environment and the interaction with academics impacted on my behaviour. Over time, I became increasingly attached to the academic approach which is reflected in my thinking and writing style. So, the transformation from a former European practitioner to a temporary Australian academic researcher became a personal challenge and a personal journey.

## ABSTRACT

Rapid changes in the competitive environment and increasing customer demands drive the public and private sectors to innovate by continually investing millions of dollars in Information and Communication Technology (ICT) projects. Basically, organisations depend on ICT technology for every part of their business. Companies are not only challenged to apply new technologies to remain competitive, they also need to spread (diffuse), manage and implement technological innovation across extended organisational boundaries.

Diffusion, management and implementation of ICT innovation involve a considerable amount of risk and potentially protracted delays of technological projects. As a consequence of high demand for ICT innovation, as well as the risk of failure, a wide range of organisations such as state agencies and banks now employ so-called change agents to diffuse, manage and implement innovation within technological projects. While a large number of academics and practitioners are concerned with change agents who alter organisational culture, structure and processes, relatively little research has been undertaken on the role of ICT change agents in the innovation process. Thus, this professional doctorate study aims to fill that gap by exploring ICT change agents' project work experiences within state agencies and banks and fuse them with theory.

The research is based on case study methodology, including 41 cases within 12 target organisations in Australia and Germany. As a former ICT change agent, the researcher of this Doctor of Business Administration (DBA) study applied mixed research methods, also incorporating her ICT project experiences by using an individual reflection model. From this investigation emerged that change agents' roles are embedded in components (organisational structure, project stages) and processes (ICT diffusion, informal networks). These findings underpin the model of ICT change agents who perform the multiple linker roles of these components and processes in order to deliver set project outcomes. The model is designed to inform practice by providing guidance for advanced ICT change agents' training in public and private sector settings.

## STATEMENT OF AUTHORSHIP

Except where explicit reference is made in the text of the thesis, this thesis contains no material published elsewhere or extracted in whole or in part from a thesis by which I have qualified for or been awarded another degree or diploma. No other person's work has been relied upon or used without due acknowledgement in the main text and bibliography of the thesis.

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| Applicant | Supervisor |
| Date | Date |

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# 1. CHAPTER ONE: INTRODUCTION

## 1.1. Significance of the research

At the beginning of the twenty-first century, growing competition arose among emerging knowledge-based economies. Since 1999, the Organisation for Economic Co-operation and Development (OECD) has made a significant contribution to our current understanding of what is commonly referred to as the knowledge-based economy (OECD, 1999). OECD member countries, which include Australia and Germany, are taking active steps toward innovation, publishing policies that encourage the use of new technologies. Such policies aim to create "innovation-driven economies" (Storey and Salaman, 2005 p. vii). In the last few years, through its rapid growth, China has been increasingly challenging such innovation driven societies (Leaders, 2007; Earl, 2007) as it is believed that innovation is essential for the survival and growth of nations. Economic growth tends to be most sustainable for those countries which are acting effectively in four dimensions:

- Innovation and technological change are pervasive, and are supported by an effective national innovation system (that is, a network of institutions in the public and private sector whose activities and interactions initiate, import, modify, and diffuse new technologies and practices).
- Human resource development is pervasive: education and training are of a high standard, widespread and continue throughout a person's working life (and even beyond).
- An efficient infrastructure operates, particularly in information and communications technology (ICT), which allows citizens and businesses to readily and affordably access pertinent information from around the world.
- The business environment (that is, the economic and legal policies of government, and the mix of enterprises operating in the economy) is supportive of enterprise and innovation

  (APEC Economic Committee, 2000 p. vi).

These four dimensions as stated in APEC Economic Committee (2000) report provide the basis for this current study. Specifically, this study centres on the human resource dimension which is reflected in change agent behaviour with the three other dimensions forming the context of the organisational settings in Australia and Germany. In this study, the term ICT encompasses both communication technologies as well as Information Technology (IT) concepts such as "…hardware, database, software, networks, and other devices (Turban, McLean and Wetherbe, 2004 p. 19). Freeman and Perez (1988) argue that the nature of ICT implies trial and error approaches which drive innovation.

Innovation is defined "… as the process of creating new ideas and putting them into practice" (Wood, Zeffane, Fromholtz and Fitzgerald, 2006, p. 508). Kanter (1983) observes that most innovation is coming from outside an organisation. Organisations foster innovation for the purpose of gaining competitive advantage (Porter, 1998). Under constant pressure to remain competitive, companies invest millions of dollars in new technologies that need to be managed. The capability to manage processes (both in the present and for the future) through a mix of human resources is believed to be the key to sustained success (Tushman and O'Reilly III, 1997). Ongoing investment in new technologies by many firms demonstrates that innovation is becoming a core business process within organisations.

Innovation is a big challenge for companies because "innovation is a complex non-linear process" (House of Representatives Standing Committee on Science and Innovation, 2006 p. 7). The big challenge is classified by Kanter (1989, p. 9) as the "post-entrepreneurial" revolution which drives organisations to apply cutting edge technologies. Longhi (2005) supports Kanter's (1989) argument by adding that the process of globalisation is characterised by an increasing number of competitors that force companies to innovate rapidly. Successful innovators implement new technologies that are most suitable for their organisational settings. However, almost all innovations

that are being embedded in organisations bring disorder and abnormality (Dodgson, 2000).

More generally, Burgelman and Maidique (1988) observe that innovation is a result of the innovation process. This innovation process is difficult, messy and risky, particularly if more than one innovation is introduced at any one time. “Simultaneous innovation is an incremental and cumulative activity that involves building on what went before, whether it is inside or outside the organization and whether the knowledge is proprietary or in the public domain” (Jorde and Teece, 2005 p. 4). In other words, the innovation process is dependent on prior operations of the company and on internal and external know-how.

Over the past decade, rapid changes in the competitive environment and increasing customer demand have driven organisations to continually invest in ICT. Basically, ICT can be a powerful enabler for the creation of new products, processes and services. Nowadays, ICT is integrated into business processes in contrast to prior practice when ICT was merely a support function. Loudon (2001) observes that an increasing number of organisations build their business models on web-based innovations. Companies are not only challenged to develop the latest web-based technologies, they also need to provide ongoing ICT service across extended organisational boundaries. Indeed, organisations now depend on ICT technology for every part of their business whereas, previously, the technical terminology was once only used by ICT experts “… such as software, download, floppy, desktop, browser, hyperlink, icon, multimedia and online have become part of mainstream language” (Wood, Zeffane, Fromholtz and Fitzgerald, 2006 p. 315). ICT is regarded as a trigger for various organisational changes (Brooks, 2006).

Productivity Commission (2004) suggests that the major reason that firms in Australia invest in ICT is to boost their companies’ performance. Organisations in both the public and private sectors benefit most from ICT when it is used as a strategic resource for

obtaining their objectives rather than for prevailing technical purposes (Commonwealth Department of Communications, Information Technology and the Arts, 2003).

In the highly competitive, rapidly changing and complex ICT environment, one of the challenges of technological innovation is its diffusion through an organisation. Rogers (1995, p. 17) highlights that: “Diffusion is a particular type of communication in which the message content that is exchanged is concerned with a new idea”. The process of technological diffusion involves a considerable amount of risk with respect to the implementation of new technologies within projects. Volk (2004) discusses two general studies that investigate the high failure and delay rates of ICT projects. The first study Volk refers to is a KPMG report that shows that 89 per cent of ICT projects overrun their schedules and 62 per cent overrun their cost. The second study, conducted by the Standish Group, concludes that 53 per cent of ICT projects will cost 189 per cent more than estimated, not including subsequent costs and business damages. The Standish Group report also shows that 31 per cent of ICT projects fail in terms of being cancelled before the planned completion date. However, companies are advised to implement their corporate strategy within projects (Longman and Mullins, 2004; Bowman, 1999). An effect of this is that Hadfield and Cliff (2005) have recently concluded that managers are expected to invest a considerable amount in ICT projects.

As a consequence of high demand for ICT innovation, as well as the risk of failure, a wide range of organisations now seek to expand the role of the change agent. Gibson, Ivancevich and Donnelly (1991, p. 745) define the role as: “An organized set of behaviors expected of an individual in a specific position”. For instance, the role can be formal, informal, internal or external. The role of a change agent differs from the role of another professional in terms that a change agent needs to possess a high degree of adoption capability and the desire for continuing improvement (Hunt, 1972). As a result, Johannessen (1994, p. 5) concludes that “the role of the change agent” is a key to the process of ICT innovation. Often, the most difficult task is to identify what role a change agent is required to perform. In many organisations, both in public and private sector settings, the formal role of a change agent is fixed in a specified job description

or contract and is quite visible in the organisation. While not explicitly stated in official meetings and documents, the informal role of the change agent may be crucial to the process being undertaken.

Research on diffusion of innovation and organisation development (OD) consistently emphasises the significance of change agents (Rogers, 1995; Bott and Hill, 1994; Hutton, 1994), yet, relatively little research has been undertaken on ICT change agents in the innovation process. In fact, there has been limited documentation of the formal and informal roles of ICT change agents in ICT diffusion within projects. Researchers and practitioners have a very preliminary understanding of ICT change agents due to the lack of research in this discipline. It has not been investigated whether public and private sector ICT change agents rely on informal networks while diffusing ICT innovation within large organisations.

For more than ten years, I have worked as an ICT change agent in ICT diffusion in various business settings in Germany. My experiences form an integrated part of this current study and support the assumption that the informal roles performed in the back corridors of power go hand in hand with change agents' formal roles in the innovation process. In the same vein, Powell and Grodal (2005, p. 70) confirm that: "Relatively few studies, however, link informal ties to the innovation process, and there is scant research on informal interorganizational relations". Therefore, this study aims to bridge that gap by providing valuable insights into informal ICT change agents' activities in ICT innovation processes and fusing them with theory.

## 1.2. Research objectives

This research aims to open up a new debate on ICT change agents and their activities which might be impacted by the process of globalisation. From 1962 until the end of the 1990s, change agents received much attention in the literature on diffusion of innovation (Rogers, 1962; Rogers and Shoemaker, 1971) and organisation development

(Beckhard, 1969; Hunt, 1972; Buchanan and Huczynski, 1997) whereas later, especially with the rise of ICT innovation, ICT change agents' operations have been barely investigated. Consequently, this study proposes to inform theory and practice related to ICT change agents as follows: Firstly, to examine, understand and explain the formal and informal activities of the ICT change agent in ICT diffusion within public and private sector projects in Australia and Germany. Secondly, to develop a model - based on theory and incorporating practice - of the ICT diffusion components and ICT change agent roles within technology projects in both public and private sector settings.

Specifically, the study intends to advance the understanding within field research about ICT change agents through a number of steps:

1. Investigate both academic and practitioner approaches related to the diffusion of innovation, organisation development and ICT to ascertain the role of the ICT change agent in ICT diffusion within technology projects;
2. Discover and analyse the ICT diffusion components within technology projects;
3. Identify and analyse the formal and informal activities of ICT change agents;
4. Compare public and private sector ICT change agent activities in ICT diffusion within technology projects.

## 1.3. Research questions

Considering the literature review in Chapter Two, the pilot study in Chapter Three and my practical work experiences as a former ICT change agent, this study seeks to answer three interrelated research questions:

1. How does an organisational setting impact on ICT change agent activities?
2. What formal and informal roles do ICT change agents play in ICT diffusion within technology projects?
3. How does the ICT diffusion process relate to project management?

## 1.4. Structure of DBA thesis

This study examines the aforementioned research questions as part of a DBA (Doctor of Business Administration) program. The Doctor of Business Administration program requires the incorporation of professional practice. The professional practice of the public and private sector change agents and my own are integrated into the DBA thesis through the case studies and reflection approach in Chapter Five and Chapter Six. This DBA thesis is composed of nine chapters.

This chapter briefly presents the significance of this academic work and outlines the study's objectives as well as the research questions. Especially significant is that large and rapid changes within different organisational settings are recurrent and they drive the growing number of ICT projects. This increases the demand for ICT change agents.

Chapter Two is an overview of the change agent literature. The review of research literature is grounded in three bodies of knowledge: the diffusion of innovation, organisation development and ICT. The intersection of these distinct literatures draws out the role of the ICT change agent in ICT diffusion within technology projects. Chapter Two is completed by identifying gaps in the literature and constructing a conceptual framework.

Chapter Three sets out the approach to this research study and its theoretical and practical groundings. After considering different research methods, a case study methodology is adopted. Case study methodology is combined with a reflective practitioner technique. The methodology specifies a series of interviews with ICT change agents to be incorporated into four case studies within six public sector organisations and six private sector companies in Australia and Germany.

Chapter Four discusses what actually happened with the snowball sampling in public and private sector settings in Australia and Germany. Specifically, this chapter looks at the snowball sampling evolution and illustrates participants' behaviours.

Chapter Five elaborates on formal and informal ICT change agents' activities within ICT projects in six public sector organisations in Australia and Germany. This chapter presents case study results and analysis incorporated into two case studies.

Chapter Six provides case study results and analysis included in two cases studies regarding the six private sector companies in Australia and Germany. This chapter is centred on formal and informal ICT change agents' activities within technology projects.

Chapter Seven outlines emerging ICT change agents' patterns in relation to components (organisational structure, project stages) and processes (ICT diffusion, informal networks).

Chapter Eight discusses the ICT change agents' patterns that emerged from Chapter Seven. In discussing the patterns, this chapter unites the academic and practitioner approaches.

Chapter Nine is a conclusion which addresses the three interrelated research questions as proposed in Chapter One. In the conclusion, a developed model underpins that an ICT change agents performs the multiple linker roles in order to deliver set project outcomes. The final part of this chapter demonstrates the wider implications of the principal findings for practitioners and academics, finishing with the limitations of this study and suggestions for future research.

# 2. CHAPTER TWO: LITERATURE REVIEW

## 2.1. Introduction

The study is set in the context of state agencies (public sector) and banks (private sector) in Australia and Germany. While studies undertaken in education areas highlight the vital role of change agents in the innovation process (Deal, 1988), relatively little research has examined ICT change agents' roles in ICT diffusion within state agencies and banks.

More generally, Rangaswamy and Gupta (2000, p. 92) acknowledge that the diffusion of innovation framework is well applied in academia, however, its use in industry is rare because "many practitioners are unfamiliar with diffusion models". As a result, this research merges a diffusion model with the project management framework for the purpose of linking academics' and practitioners' approaches within distinct organisational settings. Research undertaken by Lievens and Moenaert (2000) has shown that in the banking industry the study of innovation is a relatively new field of research.

This literature review opens with a brief overview of state agencies and banks and their increased demand for ICT change agents. Definitions and the role of the change agent are introduced next, followed by a review of the diffusion of innovation, organisation development and ICT literature. In the last section of this chapter, the gaps in the three aforementioned bodies of literature are identified and a conceptual framework is developed.

## 2.2. State agencies and banks

The push towards new technologies, combined with increased customer demand, has put extraordinary pressure on the public and private sectors to adopt innovation. There is an increasing recognition of the enormous potential of ICT technology to transform organisations in a manner that will bring benefits to businesses and consumers.

Public and private organisations are facing pressure to quickly adopt interactive and multimedia information and communication technologies. Rosenau (2000, p. 229) sums up the following well-stated distinction between public and private sectors:

> The private sector is characterised through achieving returns on the invested funds, daring to take business risks, having to anticipate market and competitive developments and realising a corporate goal. In contrast, the public sector is concerned with legislation, regulations, authorities, political opinion, political influence, democratic decision-making processes, the minimisation of risks and the realisation of a social goal.

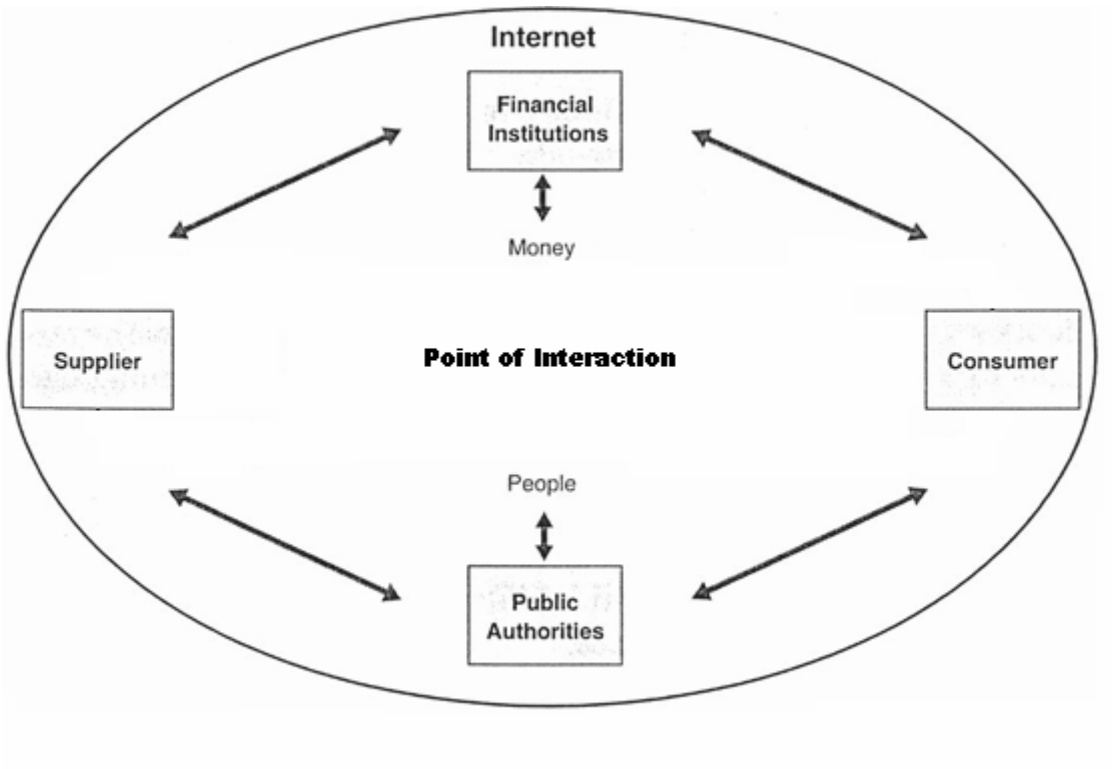
Geuna, Salter and Steinmueller (2004) argue that public and private sectors perform complementary roles for society. Especially through new ICT technologies, the public and private sectors have developed an interdependent relationship. A wide range of hardware innovations are made for armed forces or in other areas of the public sector and afterwards are diffused in the private sector. For instance, NASA was the major financial supporter for the development of the microchip (Deutsch, 1985). Nowadays, the microchip is a vital hardware component and the heart of every computer used in both public and private sectors.

On the other hand, the private sector is producing business software (IBM, 2005; Oracle, 2005). Meanwhile, the software manufactured by private companies supports the core business processes of public and private organisations. In that regard, it can be argued that the public and private sectors have reached “technological convergence” because both sectors are using equivalent ICT technologies (Borins, 1998 p. 150). However, differences towards market orientation, organisational structure and processes

in which the ICT technology is embedded, might have an impact on the role of the ICT change agent.

Depicting an electronic framework, Cunningham and Froeschl (1999) show that public and private sectors are connected within a worldwide electronic network (internet). Figure 1 serves as a useful tool to visualise these linkages.

Figure 1: Interaction between financial institutions and public agencies




Adapted from Cunningham and Froeschl (1999)

Interaction is a core part of business for financial institutions (private sector) and public authorities (public sector). Nowadays, for public authorities the new term public agencies has emerged which has been adopted in this study. National Archives of

Australia state that: "*An agency is a distinct and recognisable body which has responsibility for carrying out administrative functions*" (CRS Manual, 2006 p. 1). Figure 1 demonstrates that both financial institutions and public agencies encompass services that include suppliers and consumers.

On the one side of the electronic network, there are the financial institutions, which include banks. In Figure 1, the word "Money" highlights the focus of financial institutions to maximise returns to shareholders through profits, while serving their customer base.

On the other side of the electronic network, as depicted in Figure 1, there are the public agencies such as state agencies. So, the word "People" emphasises the constituent focus of public agencies in terms of offering services to the community.

Moncrief (2008) adds that financial institutions and public agencies interact with each other though government regulations. Consequently, the differences derived from organisational settings and the point of interaction are expected to influence the role of the change agent in the ICT diffusion and implementation process.

The ever-changing political environment requires state agencies to be adaptive and responsive to the development of new technologies. Technological change by public organisations is driven by government regulations. Osborne and Brown (2005) underline different interest groups and politics involved in innovation in public organisations. Feller (1988) highlights the political environment on the state level, pointing out that high-technology innovation can shift a competitive advantage of a state. For example, the implementation of broadband in Victoria provides access to multimedia activities such as video conferencing, making the State of Victoria one of the leading ICT states in Australia (Barker, 2005). The strong focus on ICT innovation is reflected in the formal role of a CIO. A CIO (Chief Information Officer) of the State

of Victoria defines and promotes ICT strategies within Victorian public agencies (Braue, 2005).

Other states in Australia have initiated similar policies and programs to assist organisations to make decisions towards ICT innovation. Ahern (1988) provides an example of the State of Queensland in Australia that fosters diffusion of ICT technology. In the last few years, Australian government initiatives fostered the development of an internet platform in order to provide government services online, so-called electronic government, in short e-government. As a result of those government innovative policies, Australian e-government technology services are ranked in fifth position internationally (Blumhardt, 2004).

Also, the German government runs similar innovative policies. Blumhardt (2004) refers to an international report in which German e-government services are ranked in tenth position. After the release of that e-government ranking report, German state agencies launched a large number of technology projects simultaneously. For example, the State of Hessen is catching up with the latest online technologies. So, the shift towards e-government is visible in the new position of CIO which has been established to promote innovative strategies across the State of Hessen. In the first instant, the name of the "CIO" (E-government, 2007) is eye catching because it is originally written in English.

In contrast to the government agencies which operate at the state or federal level, many banks offer their financial services nationally and internationally. Thus, banks are confronted with different challenges than state agencies. Currently, the banking industry is facing global competition that drives it to seek competitive advantage through differentiation. Johnston (2005) shows banks' profitability among 13 different countries. According to that data, Australian banks were the second most profitable behind US banks. In contrast, German banks were the worst performing among these assessed countries. After the publication of the international ranking report, Germany banks improved greatly. In 2008, German banks highlighted their profitability, for

example, Deutsche Bank achieved a record profit in 2007 (Deutsche Bank posts a record, 2008). To boost their profits, banks take increasing risks in global banking (A special report on international banking, 2007).

Besides the pressure of profit maximisation, increasing customer demand has driven the banking industry through rapid change from Lean Banking to Business Reengineering and to Customer Relationship Management (Moormann and Rossbach, 2001). However, all banks have in common the core business of financial transactions which today is entirely based on ICT. In the 1980s, ICT innovation was led by the banking industry (Child and Loveridge, 1990).

Spurred on by government deregulation, Australian banks have also moved into other business fields such as investment banking supported by ICT technology (Gottliebsen, 1985) to "… keep pace with world-wide developments in retail financial services" (Baker, 1985 p. 9).

The enormous growth of ICT technology has given rise to the increased use of ICT change agents who have the ability to cope with the technical and organisational complexities in both the public and private sector settings.

## 2.3. Definition of an ICT change agent

As business processes grow more connected and more complicated, organisations inevitably rely on ICT change agents to diffuse, manage and implement ICT innovations within their business environments.

The literature (Rogers, 1995; Buchanan and Huczynski, 1997) provides a wide range of definitions and explanations for a change agent. Rogers (1995) proposes the change agent in the diffusion and adoption process as a linker between his/her external agency and the environment in which the innovation is diffused and adopted. "A change agent usually seeks to secure the adoption of new ideas, but he or she may also attempt to

slow the diffusion process and prevent the adoption of certain innovations with undesirable effects" (Rogers, 1995 p. 335). In other words, change agents consider in advance what impact innovations may have on the potential adopters. Buchanan and Huczynski (1997, p. 480) conclude that a change agent seeks "… to promote, further, support, sponsor, initiate, implement or deliver change". Rogers' (1995) definition emphasises the role of a change agent as a linker in the diffusion of innovations. In contrast to this, Buchanan and Huczynski (1997, p. 480) highlight that the change agent's role is related to "… *content* of the change …".

The generic definitions above are worth further exploration, because they view change agents from different perspectives. From my previous work experience as an ICT change agent, there is a need to fuse these definitions to gain a better understanding of the role of the ICT change agent in the context of ICT diffusion within technology projects. Furthermore, I have observed that ICT change agents also perform informal roles through informal network processes. Therefore, this study uses a combination of the aforementioned definitions (Rogers, 1995; Buchanan and Huczynski, 1997) and my previous ICT change agents' experiences and adopts the following working definition for an ICT change agent: An ICT change agent links the diffusion of ICT innovation processes with the project management framework by performing formal and informal roles in a particular organisational setting.

While the research by de Berranger, Tucker and Jones (2001) shows that change agents rely on informal networks for technological diffusion within small companies which employ 10 or less people, this study seeks to confirm the existence and importance of informal networks used by ICT change agents in the ICT projects within large organisations.

Change agents' roles, as discussed by academics and practitioners, come predominantly from the bodies of literature on the diffusion of innovation, organisation development

and ICT; these roles are highlighted to emphasise their various functions which are discussed in the following sections.

## 2.4. Diffusion of innovation

### *2.4.1. Introduction to innovation*

Innovation has been discussed from various perspectives with innovation research being undertaken by a wide range of academics (Christensen, 1997; Drucker, 1999; Johannessen, Olsen and Lumpkin, 2001; Utterback, 1996). Innovation implies novelty (Johannessen, Olsen and Lumpkin, 2001). In some circumstances, the novelty triggers the issues that are almost by definition extremely complex. In order to argue this, Christensen (1997, p. xv) defines the term "disruptive technologies" observing that they

> … underperform established products in mainstream markets. But they have other features that a few fringe (and generally new) customers value. Products based on disruptive technologies are typically cheaper, simpler, smaller, and, frequently, more convenient to use. There are many examples in addition to the personal desktop computer …

This suggests that some emerging technologies bring disorder to companies which are extraordinarily challenging to deal with them.

Other scholars argue that organisations are challenged to a different degree depending on radical or incremental innovation. Tidd, Bessant and Pavitt (2005) propose that radical innovation discontinues with the previous practice by delivering a fundamental novelty whereas incremental innovation is an upgrade of an existing technology.

However, both types of innovation include uncertainty. Van Geenhuizen and Nijkamp (2003, p. 460) discuss the link between uncertainty and policy making in the innovation process and suggest:

> To see uncertainty not as a threat, but rather as an *opportunity* to shape the future creatively. Rather than emphasizing a choice for a presently available policy option, this approach calls for development of a vision that provides the guiding principles for present and future

> action, such as experiments reflecting stakeholders' interests and other learning exercises that may underpin policy measures.

In other words, uncertainty could be contemplated as a chance by policy makers whose guidelines also need to represent current and future practitioners' agendas in the process of innovation.

### *2.4.2. Role of change agents in the innovation process*

In the 1970s, the significance of individuals has been recognised who connect an internal network with an external provider of knowledge in the **gatekeeper** role (Tushman, 1977; Tushman and Scanlan, 1981). Allen (1977 p. 163) refers to a gatekeeper as "… a high technical performer" who plays formal and informal roles to collect technological information using the formal and informal network. Katz and Lazarsfeld (1955) view a gatekeeper as a controller of the communication channel who makes decisions about whether the message is going to reach the audience. At that time, these individuals were not explicitly called change agents.

In the 1980s, Kanter (1983) entitled the key individuals in the innovation process as **change masters** who act as new **entrepreneurs** with the aim to develop novel solutions for their companies. Due to the novelty involved in the innovation process, some scholars refer to those types of change agents as **innovation agents** (van Geenhuizen and Nijkamp, 2003; Bessant, 1999). Van Geenhuizen and Nijkamp (2003) suggest a **facilitator** role of an innovation agent whereas Bessant (1999) highlights the role of a **knowledge promoter** in the process of technological innovation. Prior to Bessant's (1999) research, Witte (1973) claims the role of **knowledge** and **power promoters** in the innovation process.

### *2.4.3. Introduction to diffusion and adoption*

It is often argued that innovation and diffusion are interrelated processes (Martinez, Polo and Flavian, 1998; Woodside and Biemans, 2005). The idea of diffusion appeared in the literature at the beginning of the 1960s. In 1962, Rogers (1962) set the scene with his seminal study on the diffusion and adoption of innovations. In broadly considering the sources and nature of innovation, Rogers (1995, p. 5) defines diffusion as "… the process by which an innovation is communicated through certain channels over time among the members of a social system". Diffusion consists of "… both the planned and the spontaneous spread of new ideas" (Rogers, 1995 p. 7). In his work, Rogers (1983) developed a general model of diffusion and adoption of innovations. He specified the characteristics of innovation that influence the diffusion and adoption process as visibility, need, experimentation, degree of difficulty and relative advantage as perceived by potential adopters in adopting the innovation. Adopters fall into different categories (Bass, 1969). Rogers (1971) categorised adopters as innovators, early adopters, early majority, late majority and laggards. Innovators are cosmopolitan who are interested in new ideas and are the first group which adopts innovation, followed by early adopters who are locals and serve as role models for other adopters. The early majority represents the average adopter in the adoption and diffusion process, while the late majority adopts innovation after the average adopter. Laggards relate to individuals with traditional values in the social system and are the last group who adopt innovation. Adopters are classified through socio-psychological characteristics such as language, values and attitudes. Brown and Venkatesh (2003, p. 77) observe that 16% of adopters are made up of innovators and early adopters, followed by 34% of early majority and 34% of late majority. The remaining 16% are regarded as laggards. This process of adoption illustrates that users take over innovation successively.

In the diffusion and adoption process, Rogers (1995, p. 241) is concerned that:

> Change agents frequently overlook the fact that almost every innovation is evaluated by clients in terms of their prior experience with something similar. The innovation may be "new vine," but it is poured into old bottles (that is, the clients' existing perceptions). The

> solution to the empty vessels fallacy is for a change agent to understand her or his clients' prior experiences with the practice that the innovation replaces. So an effective change agent must comprehend his clients' indigenous knowledge systems.

In other words, a client's decision whether to adopt or reject innovation is dependent upon previous experiences with novelty. However, there are key individuals, so-called opinion leaders (Chaney, 2001), who can influence other group members towards adoption or rejection of innovation (Leonard-Barton, 1985).

By adopting the diffusion model from Rogers (1995), this study builds on Rogers' (1995) four main components of diffusion: innovation, communication channels, time and the social system. Innovation consists of hardware and software that is viewed as new to the target group. The communication channels are the paths by which the innovation is transported to reach the receiver. Time is the period it takes until the innovation is adopted or rejected by the receiver. Change agents face a complex social system within an organisation. A social system includes the five aforementioned adopter groups which are embedded in the adoption and diffusion process of innovation.

Parallel to Rogers' investigations, other scholars (Katz, Levin and Hamilton, 1963; Hagerstrand, 1967; Mason and Halter, 1968) have been concerned with the investigation of a single innovation in the diffusion process. This type of single investigation is criticised by Rogers (1995, p. 15):

> Past diffusion research has generally investigated each innovation as if it were independent from other innovations. This is a dubious assumption, in that an adopter's experience with one innovation obviously influences that individual's perception of the next innovation to diffuse through the individual's system. In reality, a set of innovations diffusing at about the same time in a system are interdependent. It is much simpler for diffusion scholars to investigate the spread of each innovation as an independent event, but this is a distortion of reality.

Two years after Rogers' critique, in 1997, Parthasarathy, Jun and Mittelstaedt (1997) discovered that multiple diffusions occur within distinct social groups and that the

patterns of those diffusions all vary. Storey and Salaman (2005 p. 22) add to the diffusion debate that:

> What is often missed, however, in many of the studies of diffusion across a range of products is that (further) innovation can also occur during the 'diffusion' process itself. This occurs because users adapt (that is, alter and develop) the initial innovation to their own perceived requirements and they may use it in unexpected and unpredictable ways.

More generally, Hall (2005) observes that in the diffusion process set technological standards were predominately adopted because of the path dependence and not because of the best technology solution.

While Rogers (1995) criticises diffusion scholars for not taking into account the simultaneous innovations that take place in the business environment, Storey and Salaman (2005) point out that original innovation can be changed by adopters during the diffusion process. In addition, Hall (2005) proposes that the set standards do not inevitably imply adoption of the best technology solution. These critiques are significant for this study, because they may affect ICT change agents' roles in the diffusion and adoption process.

### *2.4.4. Role of change agents in diffusion and adoption*

The diffusion of innovations literature views the profession and function of a change agent in the diffusion and adoption process. Rogers (1995) refers to various occupations such as **teachers**, **consultants** and **salespeople** as change agents, arguing that in their role as **linker** they couple the client system with their organisation while diffusing innovation. Baker (1994) describes a change agent as a **marketer**. "As a marketer, you try to get customers (adopters) to buy (adopt) your products or services" (Baker, 1994 p. 228). In a similar vein, Rogers (1995, p. 335) refers to the role of an **influencer** by proposing that: "A *change agent* is an individual who influences clients' innovation-decisions in a direction deemed desirable by a change agency". In other words, change agents build relationships with their clients with the aim to influence their behaviour

towards adoption of innovation. In order to argue this, in their cross-cultural studies, Rogers and Shoemaker (1971) refer to seven change agent roles in the planned introduction process of innovation:

- In the first stage of the introduction process of innovation, the change agent plays an **initiator** role to change his or her clients' behaviour towards innovation. Usually, he or she emphasises the problems in the clients' environments and demonstrates the capability to solve them.
- In the second stage, a change agent performs the role of **relationship builder**. To establish good relationships with clients, a change agent demonstrates an interest in clients' needs and problems. In this case, he or she tries to make an impression of trustworthiness and credibility.
- In the third stage of the introduction process of innovation, a change agent's role is to be a **diagnostician** with an aim to identify and analyse clients' cases. He or she needs to transform him or herself and look at the situation from the clients' perspective.
- After the diagnosis process is completed, in the fourth stage a change agent performs the role of **motivator** to prepare a client to innovate. He or she views the clients' situation and encourages clients to change their behaviour in order to achieve targeted objectives.
- In the fifth stage, a change agent performs the role of **promoter** with an aim to provide clients with information to take action towards innovation. Information is selected according to clients' needs to accelerate the adoption of innovation.
- In the sixth stage, a change agent plays the role of **stabiliser** intending to help clients keep up with adopted innovation.
- Finally, a change agent performs the role of **terminator** aiming to end relationships with targeted clients. He or she supports clients to

become innovative and become change agents in their own right without external influence. A change agent seeks to become redundant to his or her clients.

### *2.4.5. Role of change agents in informal networks*

Powell and Grodal (2005, p. 60) observe that: "Networks vary from short-term projects to long-term relationships …". Kakabadse, Bank and Vinnicombe (2004, p. 177) suggest that the purpose of a network is "… to influence particular individuals in an organisation". Consequently, informal networks play a vital role in the process of innovation (von Stamm, 2003).

It is interesting to note that a few studies investigating individuals' behaviour within informal networks emerge from the non-ICT literature. For example, several studies (Awazu, 2004; Allen, 1977; Katz and Lazarsfeld, 1955) have investigated the role of actors within informal networks without naming them directly as change agents, but with similar functionality as suggested by scholars who have examined change agents (Rogers, 1995; Rogers and Shoemaker, 1971; Varney, 1977; Beckhard, 1969). Members of an informal network are not organised in one network, do not need to work towards objectives (Katz and Lazarsfeld, 1955) and are out of management's control (Allen, 1977).

Awazu (2004) refers to five informal roles performed by informal network players. They are: **central connectors**, **boundary spanners**, **gatekeepers**, **bridges** and **experts**. The central connectors hold information about the key individuals who can provide others with certain knowledge. This enables them to select the fastest route by looking for informants in the formal system. The boundary spanners link the local network with other networks outside the system. They have accumulated information about different networks and can communicate with various expert groups. The gatekeepers monitor the incoming and outgoing information flow within a network. The bridges create a link

among individuals with different skills and backgrounds. For instance, they can help to improve communication between executives and experts. The experts learn from their own and others' experiences and gain the knowledge of innovation on particular products and processes.

## 2.5. Organisation development

### *2.5.1. Introduction to organisation development*

To quote Cummings and Worley (1993, p. 2), organisation development "… is more an adaptive process for planning and implementing change …". Change differs from innovation, although they are often interrelated. Osborne and Brown (2005) argue that change implies the continuous development of established organisational products, processes and services. Kanter, Stein and Todd (1992, p.9) specify that change "… is a consequence of the inherent potential for development associated with every entity".

On the other hand, Osborne and Brown (2005) highlight that innovation discontinues with past events in terms of introducing new ideas in an organisation that requires new know-how. Davis (1986) assumes that technological innovation and organisational change go hand in hand.

In the field of organisation development, change agents have been the subject of even greater practitioner interest than in the diffusion of innovations literature. This is evidenced by the increasing number of papers concerned with change agents. More generally, Buchanan's and Huczynski's (1997) remarks illustrate that a change agent performs the role of an **initiator**, **promoter**, **supporter**, **sponsor**, **implementer** and **deliverer** of change within an organisation. Change agents' roles fall into four categories: organisational structure, organisational culture, organisational processes and project management.

### *2.5.2. Role of change agents in organisational structure*

Mintzberg (1993, p. 2) describes an organisational structure "… as the sum total of the ways in which its labor is divided into distinct tasks and then its coordination is achieved among these tasks". Tasks are planned by supervisors. Research by Likert (1967, p. 47) has shown that:

> … the relationship between the superior and subordinate is crucial. This relationship, as the principle specifies, should be one which is supportive and ego-building. The more often the superior's behavior is ego-building rather than ego-deflating, the better will be the effect of this behavior on organizational performance.

In other words, the interaction between supervisors and their staff impact on organisational outcome.

Large organisations consist of many levels of controlling mechanisms. These different supervision levels lead to a hierarchy – "the system of formal authority" (Mintzberg, 1979 p. 104). The hierarchy can be formed through distinctive organisational structures. Mintzberg (1993, p. 189) distinguishes between different types of organisational structures, for example, one of these organisational forms is labelled as a "*Professional Bureaucracy*" which expounds the standard processes.

Within an organisational structure, many scholars view the role of a change agent as a functional role. The functional role "… refers to the job demands that a person has been engaged to meet by supplying the requisite technical skills and operational knowledge" (Belbin, 1993 p. 24). Robbins (1987, p. 312) subscribes to the theory that a change agent "… initiates structural change". Hamlin, Keep and Ash (2001) describe a change agent as an organisation development practitioner with roles such as **supervisor**, **manager**, **trainer**, **developer** and **adviser**. Bennis (1966) and Hunt (1972) add the role of a **consultant** whereas Grant and Cibin (1996) regard the **Chief Executive** as a change agent.

### *2.5.3. Role of change agents in organisational culture*

An organisational culture is viewed from a macro and micro perspective within an organisation.

> The macroanalytic theories have in common an attempt to understand the culture of a whole group or subgroup, the functions that culture performs in maintaining the group, or the conditions under which the group and its culture and subcultures develop. The microanalytic theories present culture as something that resides within each individual and can be understood through the cognitive processes of sense-making, learning, and causal attribution, or by probing the unconscious mind (Ouchi and Wilkins, 1988 p. 236).

Barker's (1992, p. 56) position goes beyond organisational culture emphasising "archetypes of change agents" as **paradigm shifters**. Paradigm shifters change fundamental beliefs and assumptions in an organisation culture which are commonly accepted as true by employees. By comparison, Meyerson's and Scully's (1995, p. 586) approach to change agents regards the debate about paradigm shifters emphasising certain types of change agents as "**tempered radicals**". These individuals make up a minority group within an organisation that is culturally different from their individual values and beliefs. The commitment to their own organisation and at the same time to the community or ideology that is different from their company's culture drives them to initiate a cultural change. Whereas French and Bell (1978) take a very different view of the change agent observing that a change agent assists management by changing an organisational culture which is reflected in a **catalyst** role.

Depending on the organisational culture, Buchanan and Badham (2008) argue that varying political games are played in order to establish the powerful positions within an organisation. Change agents need to be prepared for these types of games when embarking on organisational change (Buchanan and Badham, 2008). This could be particularly the case in the process of trans-organisational development (TD). TD is a strategic approach which is based on collaboration between different companies with the aim to foster their competitiveness (Cummings and Worley, 1997). In the words of

Cummings and Worley (1997), change agents need to perform the role of an **activist** by taking actions to engage employees from different organisations to exchange information. In the forming TD process, change agents are advised to keep the role of a **neutral** person by respecting all employees equally (Cummings and Worley, 1997).

### *2.5.4. Role of change agents in organisational processes*

At the beginning of an organisational process, a change agent performs the role of a **catalyst** supporting the organisational change strategy through the company (Varney, 1977). Just as Varney (1977) claims the catalyst role of the change agent, so too does Hunt (1972), who highlights the other role of a change agents as that of an **analyst**. Before analysing data, a change agent role in that process is viewed as **collector of information** and **planner of technical training and consulting** (Beckhard, 1969). In the data collection during the planned change process, the change agent performs the roles of a **relationship builder** and a **consultant** (Lippitt, Langseth and Mossop, 1989). After gathering data, Gibson, Ivancevich and Donnely (1991) refer to change agents as **interpreter** and **presenter** of data.

The above roles can be performed by a change agent who is employed inside (internal change agent) or outside an organisation (external change agent). Case, Vandenberg and Meredith (1990) differentiate between the **internal** and **external** role of a change agent. During the implementation, a change agent plays the **facilitator** role assisting adopters to participate in the change process (Hirschheim, 1987; Chell, 1987; Burnes, 2000; Wood, Zeffane, Fromholtz and Fitzgerald, 2006). Adopters receive new information from change agents who are dependent on external sources to accumulate new knowledge. Relating to this, Bowers and Franklin (2000) refer to the change agent role as a **transducer** – a linker between their theoretical knowledge regarding the function of an organisation and practical know-how about a particular organisation or a group with which he or she is involved.

While the discussion above is concerned with organisational environments in general, a few scholars have paid attention to change agents' roles in public sector settings. Hatton (2001) views a change agent role as a **diagnostician** who needs to scope up organisational requirements within public sector settings. Buchanan and Boddy (1992) describe the role of change agents in public sector settings as the **net-worker** and **team builder**. A net-worker focuses on building the internal and external connections within an organisation. A team builder is concerned with creating productive working groups.

### *2.5.5. Role of change agents in project management*

Usually, a project is initiated to develop or improve products, processes and/or services within an organisation (Cleland and Ireland, 2002). Keeling (2000, p. 2) emphasises three main identification points for projects such as "separate undertakings", "discrete purpose and objectives" and "limited duration". Kerzner (1995) adds that the termination date, limited budget, objectives and resources characterise a project. In the same vein, Badiru and Pulat (1995 p. xiii) argue that: "*Project management* is the process of managing, allocating, and timing resources to achieve a given goal in an efficient and expedient manner". Project management is an instrument for "successfully dealing with time, cost and change-driven decisions" used by project managers (Hartley, 2003 p. 3). In other words, a project includes the formal processes that can be measured on set criteria.

A project is initiated on a temporary basis. Bolton (2006, p. 17) suggests that a project needs to be viewed as a temporary system which "… has some kind of performance evaluation criteria, and is so complex in terms of roles and the number of roles that it requires conscious organising efforts …". Consequently, it takes time until organisations familiarise themselves with the temporary nature of projects. As a result, for years a project manager was not recognised in the organisational structure. Nowadays, a project manager is acknowledged as a "profession that deserves reasonable status and rewards, with its own professional associations …" (Lock, 1996 p. 21).

Dependent on business settings, the project manager plays the roles of **facilitator**, **communicator** and/or **virtual project manager** who is responsible for cross-functional teams (Mantel, Meredith, Shafer and Sutton, 2005). Cross-functional teams engage numbers of employees across different business units in an organisation with the aim to improve an organisational process (Zenger, Musselwhite, Hurson and Perrin, 1994).

Donnellon (1996) underlines that many managers are rather concerned with controlling teams than supporting team work. Belbin (1993, p. 124) stresses that this is a case in organisations in the public sector arguing that: "… politics is about power and its centralization, which takes us through the controlling mechanisms of hierarchy …". "Ironically, in this context where the sense of control was deemed so critical, there was less real control because accurate information was never passed on to management" (Donnellon, 1996 p. 224).

Each group member can contribute to the accomplishment of organisational objectives through problem-solving activities (Marchington, 1992). However, some team members do not communicate their ideas. "Communication includes expression; it also includes perception, retrieval of information, and impression" (Allen and Lientz, 1979 p. 4). Others follow up their own interests, which are not visible to other members of the system. In that case, Kerzner (2005, p. 29) speaks of "hidden agendas". Miller (1992, p. 121) points to "the hidden action problem" of team members that are not under management control. The behaviour of team members may influence the role of a change agent.

Schein (1997) views a change agent in the role of a **consultant** within a project who provides specialised knowledge to their clients. In a project, change agents' roles are linked to the change process itself and different managerial tasks which take place (Buchanan and Huczynski, 1997).

There are many different project models discussed in the project management literature recommending standard procedures for the best practice (Loo, 2003). Similarly, the proposed project management models underline the distinct project management stages. This study adopts the Western Australian Innovation Centre (2005) model which emphasises four project management stages that proceed sequentially from initiation to planning, execution and then finally to close-out. This four-stage model is widely adopted by practitioners in project management. A project leads off with the first project management stage called “initiation”, followed by “planning”, “execution” and “close-out”. In those distinctive stages various activities are performed. In the initiation stage, the project needs to be confirmed. Projects are ranked according to criteria set by decision-makers. Projects concerned with product innovation ensure the survival of the firm and, therefore, have a good chance of being selected (Vaupel, Schmolke and Krueger, 2000). The planning stage includes commencement and completion dates, detailed plans regarding the tasks, resources and costs (Kerzner, 2003). In the execution stage, the project is implemented in the business environment. In the final project management stage, the close-out stage, the project is reviewed and completed producing the anticipated project outcome.

## 2.6. ICT

### *2.6.1. Introduction to ICT projects*

Chapman and Ward (2003) suggest that the risk of not achieving a planned project outcome can be calculated. However, ICT projects differ from other project types. ICT projects are becoming increasingly complex including multiple functions that require professional project management. Charvat (2003) supports the idea that an ICT project is complex by advancing three arguments. Firstly, ICT projects involve various business units with specific requirements that need to be considered. Secondly, the implementation of ICT innovation in each business unit has a different priority. Finally, a new software program needs to fit in with other applications that require specific skills and is difficult to calculate in respect of time and budget. An effect of this is that the

heterogeneity of adopters enters into a technological project at distinct times (Quintas, 1994). The Victorian Law Reform Committee Report (1999) adds the argument that organisations need to consider diverse adopter groups in the innovation process. Recently, Libert and Spector (2008) suggested that the web-based innovations support the trend towards virtual interaction with different adopter groups.

ICT innovations are considered as hyper-competitive. This means that ICT technologies have short life cycles measured in months (Tidd, Bessant and Pavitt, 2005). In other words, ICT "… applications require significant innovative effort, as substantially new …" updates are created (Miles, 2005 p. 439). Usually, these new updates are developed and implemented within projects.

Two decades ago, about 90 per cent of ICT projects did not meet their planned time and budget goals (Tani, 2001). Automated tests within projects make programming failures transparent (Henney, 2005). Tani (2001) adds that through new software testing methods, the failure rate has been reduced to 50 per cent. However, there are still major problems. Charvat (2003) refers to surveys that show 84 per cent failure or delay rates of ICT projects. The Gartner Group points out that 40 per cent of ICT projects do not achieve targeted outcomes (Anon., 2001). The majority of ICT projects have failed in terms of overruns of schedule and costs (Krempl, 2004; McBride, 2004). Nonetheless, the demand for ICT projects is growing.

As a result of high demand for ICT technology as well as the risk of failure, a wide range of organisations now seek the help of ICT change agents to initiate, manage and diffuse ICT within projects. Findings by Gott, Lajoie and Lesgold (1991, p. 113) suggest that employees need more "adaptive expertise" to solve technical problems. Increasing complexity in the technical, organisational and communication structure in today's ICT projects drives the demand for ICT change agents.

### *2.6.2. Role of change agents in ICT innovation*

A wide range of ICT literature is concerned with technological innovation, e.g. implementation of hardware and software systems (Ramalho, Ferreira, Faria and Castro, 2007). As a result, some studies view software and hardware components, which trigger changes in the process of ICT innovation, as change agents (Wickham, 2007; Daniels, 1994). However, despite the complexity of ICT projects and demand for ICT change agents, in the ICT literature there is only a small strand focused on activities that are executed by human ICT change agents.

Johannessen (1994, p. 5) views an ICT change agent as a **manager** who needs "… to develop particular boundary roles …". He (Johannessen, 1994) suggests that a **boundary** role of an ICT change agent links internal units with external providers of knowledge. In a study conducted by Kendra and Taplin (2004), the role of the **project manager** refers to an ICT change agent and is similar to the role of change agent described in the organisation development literature. The organisation development researchers, Robbins, Millett, Cacioppe and Waters-Marsh (1998, p. 673) who are primarily concerned with organisational behaviour, propose that the roles of **facilitators** describe technology change agents who "… introduce new equipment, tools or operating methods".

Weiss and Anderson (2004) find that **Chief Information Officers** and **ICT professionals** are ICT change agents. ICT change agents design and diffuse ICT innovation within an organisation that is often developed outside their organisation. For example, ICT professionals who were employed in other industries have been instrumental in triggering radical changes in online financial services (Tidd, Bessant and Pavitt, 2001). Winston (1999) adds that the **information system consultants** perceive themselves as ICT change agents. While the studies above focus on the individuals as ICT change agents, Ross (1992) refers to the whole group in the **information systems department** as ICT change agents. This current research adopts

the view that the role of the ICT change agent in ICT projects is related to diffusion, management and implementation of ICT technologies across extended organisational boundaries.

## 2.7. Gaps in the literature

In evaluating the diffusion of innovation, organisation development and ICT literatures vis-à-vis the role of the change agent, four major gaps have been identified:

Firstly, there has been limited investigation of the role of the change agent in ICT diffusion within technological projects. This is particularly due to the fact that few researchers view ICT professionals as change agents.

Secondly, little is known about the role of the ICT change agent in specific organisational settings such as state agencies and banks. Those different settings might have the potential to significantly impact on the role(s) of the change agent in the ICT diffusion process.

Thirdly, the literature generally reviews change agent roles in formal situations. The majority of researchers do not make a distinction between formal and informal roles of change agents. Particularly, there is little evidence of informal change agents' roles through informal network processes.

Fourthly, a number of researchers have investigated a particular innovation separately from other innovations. However, the rapid change of ICT technology and increasing competition drive many organisations to introduce more than one innovation simultaneously. Moreover, during the diffusion process, some adopters may change ICT innovation to fit better into their particular business unit. This practice might have a significant impact on the role of a change agent within ICT projects.

## 2.8. Gaps from a practitioner's point of view

Change agents require theoretical and practical knowledge to be capable of initiating, managing and diffusing ICT innovation within an organisation. As a former technology change agent, I am concerned about the absence of some important consideration in regard to practice and change agents' behaviour. Therefore, I address three interrelated issues that do not appear to be covered in the diffusion of innovation, organisation development and ICT literature:

Firstly, the diffusion of innovation literature provides a theoretical framework for the diffusion process while not taking into account budget and resource planning. The organisation development literature focuses on practitioner activities taking project management for granted without considering the roles of change agents in distinct project management stages. The ICT literature, on the other hand, builds on organisation development without discussing the diffusion process. From my experience, there is a need to link the diffusion process with different project management stages.

Secondly, highly competitive ICT innovation drives change agents to be quick adopters of new ICT technologies. Very often, ICT innovations need to be customised to fit better with other applications in organisational settings. Change agents practice experiential learning to accomplish that task.

Thirdly, the literature on diffusion of innovation, organisation development and ICT primarily focuses on the planned and formal processes of innovation. Sometimes, change agents spontaneously and informally introduce, manage and diffuse new technologies that afterwards are established as formal processes. Many change agents socialise with their clients. In such informal situations, the distance between the customer and change agent is decreased and change agents sometimes feel encouraged

to spontaneously introduce new ideas that they might not venture in formal settings. This may have an impact on ICT diffusion.

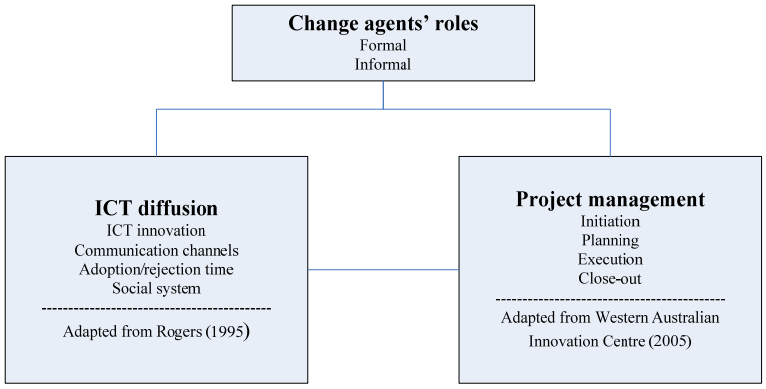
## 2.9. Conceptual framework

The bodies of literature on diffusion of innovation, organisation development and ICT state that change agents operate on different levels related to an organisational structure, organisational culture, organisational processes, diffusion processes and project management. Consequently, change agents' roles are embedded in these components.

While academics tend to rely on theoretical frameworks for the diffusion of innovation like that of Rogers (1995), practitioners use project management as a core instrument for the diffusion of ICT technologies across extended organisational boundaries. Project management is the formal process which requires that a balance needs to be struck among costs, resources and delivery project dates. A project consists of distinctive project stages such as initiation, planning, execution and close-out, as the project principle specifies. The Western Australian Innovation Centre (2005) takes a practitioner approach to project management emphasising those different project management stages. On the other hand, diffusion can be a formal or informal process, as noted, including ICT innovation, communication channels, adoption/rejection time and a social system.

The conceptual framework in Figure 2 combines change agents' roles, the ICT diffusion and project management, assuming that these elements are interrelated. Further research is required to examine the nature of their relationship.

Figure 2: Conceptual framework




This study aims to fill the demonstrated gaps as discussed in the previous sections by positioning change agents' roles in the context of academic (Rogers, 1995) and practitioner (Western Australian Innovation Centre, 2005) approaches.

## 2.10. Conclusion

This chapter has provided the context of this research and the literature pertaining to change agents' roles. Since the research takes place within technology projects of state agencies (public sector) and banks (private sector) in Australia and Germany, the chapter has briefly discussed that technological change in those sectors is triggered by different factors. In state agencies, technological change is initiated by political agendas. In contrast, technological change within banks is pressured through the market. While the state agencies are primarily concerned with the efficiency of processes and services, the main focus of the banking industry is toward profits. In addition, state agencies introduce policies and programs which aim to support organisations by diffusion of new ICT technologies. More generally, banks use the ICT platform for the development of new products and services with the aim to obtain a competitive edge. These differences are not necessarily negative or positive for the change agents, but they have the potential to significantly impact on the roles of the change agents in the ICT diffusion process within technological projects.

A comprehensive definition of change agent currently does not exist in the diffusion of innovation, organisation development and ICT literature. By comparison, in diffusion of innovation literature change agents spread new ideas; in organisation development they alter the organisational structure, culture, processes; in ICT literature they spread technical innovation and implement new technologies. Change agent is a broad term encompassing an array of roles. Scholars of innovation and diffusion literature refer to the roles of the change agents as **gatekeepers, change masters, entrepreneurs, innovation agents, facilitators, knowledge promoters, power promoters, teachers**, **consultants**, **salespeople, marketers, linkers**, **influencers**, **initiators, relationship builders**, **diagnosticians, motivators, promoters, stabilisers, terminators, central connectors**, **boundary spanners**, **bridges** and **experts**. Organisation development literature encompasses the change agents' roles of **initiators**, **promoters**, **supporters**, **sponsors**, **implementers**, **activists**, **neutral role**, **supervisors**, **managers**, **trainers**, **developers**, **advisers**, **consultants**, **Chief Executives**, **paradigm shifters**, **tempered radicals**, **catalysts**, **analysts**, **collectors of information** and **planners of technical training and consulting**, **relationship builders**, **interpreters**, **presenters**, **internal**, **external**, **facilitators**, **transducers**, **diagnosticians**, **net-workers**, **team builders**, **communicators** and **virtual project managers**. Much of the literature on diffusion of innovation is concerned with proposed and spontaneous spread of new ideas and technologies. In contrast, organisation development literature covers planned change in an organisational strategy, structure, culture, processes and project management which is carried out by change agents.

In the ICT literature, there is a limited state of knowledge on change agents. In fact, the ICT change agent is a relatively new field of research – so much of its origins can be traced back to the organisation development literature. A few ICT studies that have examined this topic underline the role of the **managers**, **project managers**, **facilitators**, **Chief Information Officers**, **ICT professionals**, **information system consultants** and **information systems departments** in a technical context.

The organisation development literature is far more advanced than the diffusion of innovation and ICT literature in its treatment of change agents. The field of diffusion of innovation and organisation development provide an exceptional springboard for testing those change agents' roles in ICT diffusion within technological projects. Specifically, this approach will show if these roles are directly applicable to ICT change agents.

This chapter has integrated an academic and a practitioner approach within a conceptual framework. The next chapter will apply this framework as a basis for the development of the methodology. The chapter will offer an overview of the case study methodology used in this research.

# 3. CHAPTER THREE: METHODOLOGY

## 3.1. Introduction

In the previous chapter, the literature on diffusion of innovation, organisation development and ICT has been reviewed and a conceptual framework constructed. In this chapter, the conceptual framework will be applied for the development of a case study methodology. After establishing the parameters for the research and providing an overview of the organisational selection criteria, the choice of methodology will be discussed. This will be followed by descriptions of the case study method, research design, data collection, sampling, researcher's background, validity and measurement of data, analysis and conclusion.

## 3.2. Establishing the parameters

To date, few studies have focused on change agents in ICT diffusion within technological projects. Especially significant is that very little research has concentrated on the role of the change agent in ICT diffusion in the context of state agencies and banks. Having worked as a change agent in the state agencies and banks in Germany, it is fitting to explain my work experience and match it with other change agents' experiences in similar organisational settings in Germany and Australia.

To encapsulate the findings of Robbins, Millett, Cacioppe and Waters-Marsh (1998, p. 51), German culture emphasises doing, while "Australians … work relatively hard but also value their leisure and are not likely to sacrifice one for the other". Hofstede's framework of cultural diversity demonstrates that Australia has lower power distance than Germany in terms of showing respect for those in authority (Hofstede, 1991). Similarly, Australia and Germany fall into the category of individualist societies in which people follow their own agendas (Hofstede, 1991). As a result of the

aforementioned findings, this study investigates change agents' formal and informal roles in the diffusion process within technological projects in public and private sector settings in Australia and Germany that may have an impact on the outcome of the ICT projects.

## 3.3. Criteria for selection of organisations

ICT has played a vital role in transforming state agencies and banks in the manner that brings new services to customers. Mason (2002) stresses a need to pay attention to the organisational and technical level for the selection of organisations. State agencies and banks were selected because of their complex organisational and ICT structure as well as for their employment of change agents. Change agents in those specific settings are more likely to perform varying roles during the ICT innovation process to meet customer demands. Research undertaken by Praille and Baldwin (1988) demonstrates that the role of key individuals can only be understood within the organisational context. Having worked as both an internal and external change agent with state agencies and banks in the State of Hessen in Germany, this study focuses on those sectors and intends to capture the work experiences of other change agents in similar settings. In order to facilitate a comparison of change agent roles in similar public and private sector settings in Australia and Germany, Australian organisations were selected within the State of Victoria according to their closest possible resemblance to the German organisations within the State of Hessen.

## 3.4. Identifying a methodology

At the beginning of this research, I assumed that action research was a suitable method because it assists the researcher to improve practice (McLean, 1995; Stringer, 1996; Lerner, 1997). Moreover, action research involves taking action and allows for the development of theory about that action (Coughlan and Coghlan, 2002). However, action research has been criticised for its political content, because often the researcher is in a dilemma about which side to take (David, 2002). Previously, I developed a

strategy which I intended to use to capture other change agents' practices and compare those with my own experiences. After reviewing the strategy process, I became aware that although I performed an active role as a change agent in Germany, I would not be in a position to play an active change agent's role in Australia. For that reason, action research was not a suitable method for this study.

There was, nonetheless, a need to fuse my extensive experiences as a change agent with academic research. In the words of Hollway and Jefferson (2000, p. 3),

> Research is only a more formalised and systematic way of knowing about people, but in the process it seems to have lost much of the subtlety and complexity that we use, often as a matter of course, in everyday knowing. We need to bring some of this everyday subtlety into the research process.

Everyday experiences of change agents in the ICT diffusion and implementation process were obtained through interviews as a part of qualitative research. Qualitative research is a suitable instrument to capture "… the complexities of the unstructured nature of information systems implementations" (Von Hellens, Beekhuyzen and Kerr, 2006 p. 17). As a result of this observation, the qualitative approach was applied in the case studies.

## 3.5. Case study method

According to Eisenhardt (1989), case study methodology unites different methods of data collection. Case study methodology provides a useful technique for using multiple data collection instruments in the context of specific settings (Yin, 1993). Hamel, Dufour and Fortin (1993) observe that the case studies developed in local environments have been discussed and applied in a global context.

Case studies explore the "uniqueness of situations", focusing on "issue-related observations", making the cases comparable with each other and telling the story to convey the knowledge from author to reader (Stake, 1998 pp. 86-100). Every case is different. Yin (1984) stresses the empirical and "… the distinctive characteristics of the

case study as a research method" (Yin, 2003 p. 2). Babbie (2004, p. 293) argues further that "… case studies can form the basis for the development of more general, nomothetic theories".

A case study consists of one or many cases (Hammersley and Gomm, 2000). Ragin and Becker (1992, p. 9) view a case as "empirical units" and "theoretical constructs" arguing that to truly understand those distinctions it is necessary to briefly review the philosophical discussion about realism and nominalism (see Table 1). While realists suggest that cases exist in an empirical environment, nominalists highlight that cases are constructed from theory to assist a researcher (Ragin and Becker, 1992 p. 8). It is not the intention of this research to deepen those philosophical ideas, but rather to recognise their existence and relate them to the cases under investigation. Table 1 outlines that discussion.

Table 1: Overview of cases

| | **Case conceptions** | |
|---|---|---|
| **Understanding of cases** | **Specific** | **General** |
| **As empirical units** | **1. Cases are found** (Harper) | 2. Cases are objects (Vaughan) |
| **As theoretical constructs** | **3. Cases are made** (Wieviorka) | **4. Cases are conventions** (Platt) |

Source: Ragin and Becker (1992, p. 9)

Table 1 offers a good starting point for a better understanding of cases from four different perspectives:

**Cases are found**: Cases are specific that exist in a particular environment and need to be identified and integrated into the research process (Harper, 1992).
**Cases are objects**: Cases are general in nature that exist in the real world and therefore do not need to be discovered in the research process (Vaughan, 1992).
**Cases are made**: Cases are specific that emerge in the research process through the theoretical construction of empirical data (Wieviorka, 1992).
**Cases are conventions**: The nature of cases is general as a result of accumulated academic investigations that are created through external theoretical knowledge (Platt, 1992).

This research adopts the concept that cases are found, as highlighted in Table 1. "A case is often thought of as a constituent member of a target population" (Stake, 2000 p. 23). Thus, every interview with a technology change agent together with project documents will provide empirical data for a specific case in certain organisational settings in Australia and Germany. Those cases will be used to construct specific case studies within state agencies and banks. The designed case studies will provide a basis for the development of a model of change agents' behaviour in ICT diffusion in public and private sector settings.

The case study method is an inductive approach that unites change agents' reality with constructed theory. The four thematically linked case studies, represented in Table 2, were selected in respect of the arguments listed in the previous passages supporting the choice of case study methodology. Following Patton (1990), there is no recommendation regarding the appropriate number of case studies that could guide the researcher.

Table 2: Case studies in this research

| | **Public sector settings**<br>**State agencies** | **Private sector settings**<br>**Banks** |
|---|---|---|
| **Australia** | Case study 1<br>"The role of an ICT change agent in ICT diffusion within technology projects in Australian state agencies" | Case study 3<br>"The role of an ICT change agent in ICT diffusion within technology projects in Australian banks" |
| **Germany** | Case study 2<br>"The role of an ICT change agent in ICT diffusion within technology projects in German state agencies" | Case study 4<br>"The role of an ICT change agent in ICT diffusion within technology projects in German banks" |

The first and second case studies focus on ICT change agents' behaviour within six state agencies in Australia and Germany.

The first case study, "The role of an ICT change agent in ICT diffusion within technology projects in Australian state agencies", investigates the behaviour of twelve change agents who have initiated, managed or diffused ICT innovation for state agencies such as Multimedia Victoria (MMV), Victoria Legal Aid (VLA) and the State Revenue Office (SRO) within the State of Victoria in Australia. MMV is responsible for the implementation of ICT technologies within the State of Victoria (MMV, 2006). VLA provides services for the community regarding family, health care, youth, work, money and social issues (VLA, 2006). SRO Victoria is concerned with payroll tax, land tax, financial institution duty, debits tax and stamp duty (SRO, 2006).

The second case study, "The role of an ICT change agent in ICT diffusion within technology projects in German state agencies", studies the behaviour of twelve change agents who have initiated, managed or diffused ICT innovation for Hessische Zentrale fuer Datenverarbeitung (HZD), Hessisches Sozialministerium (HSM) and Hessisches

Ministerium der Finanzen (HMDF) within the State of Hessen in Germany. HZD provides the State of Hessen with ICT solutions (HZD, 2006). HSM is concerned with implementation of policies regarding the family, health care, work place and social issues (HSM, 2006). Taxation agencies are integrated in HMDF with a focus on tax revenue within the State of Hessen (HMDF, 2006).

The third and fourth case studies reflect ICT change agents' behaviour within six banks in Australia and Germany.

The third case study, "The role of an ICT change agent in ICT diffusion within technology projects in Australian banks", seeks to examine the behaviour of twelve change agents who have initiated, managed or diffused ICT innovation for the Australia and New Zealand Banking Group (ANZ), Commonwealth Bank of Australia (CBA) and National Australia Bank (NAB) within the State of Victoria in Australia. According to Hunt and Terry (2005, p. 68) the ANZ, CBA and NAB are the biggest "Australian-owned banks" in Australia. All three banks provide similar financial products and services in the following summarised promotional information: ANZ focuses on retail banking, regional and rural banking, mortgages, consumer finance (credit cards), banking products (consumer transaction), investment and insurances (ANZ, 2006). CBA provides services in retail, premium, business and institutional banking, funds management, superannuation, general and life insurances, broking services and finance company activities (CBA, 2006). NAB serves customers with financial products such as credit cards, loans & leasing, savings & transactions, insurances & superannuation, investment and financial planning (NAB, 2006).

The fourth case study, "The role of an ICT change agent in ICT diffusion within technology projects in German banks" focuses on twelve change agents who have initiated, managed or diffused ICT innovation for the largest German banks (Association of German Banks, 2006), namely, Deutsche Bank (DB), Commerzbank (CB) and Dresdner Bank (DreBa) within the State of Hessen in Germany. DB focuses

on global markets, global banking, private & business clients, private wealth management and asset management (DB, 2006). The primary focus of global markets is on trading, foreign exchange and money markets. Global banking provides products and services regarding asset finance and leasing, commercial real estate and debt capital markets. DB offers various financial products and services for private and business customers. Private wealth management includes a combined portfolio of products and services towards finance and estate planning. Asset management introduces the mix of equities, bonds and real estate products. CB primarily focuses on retail banking and corporate banking (information management, cash & treasury, investment, payments) in Germany and Europe (CB, 2006). DreBa covers the sphere from private banking, wealth management, corporate financial portal (payment services, asset management, insurances, guidance on occupation pensions) to investment banking (DreBa, 2006).

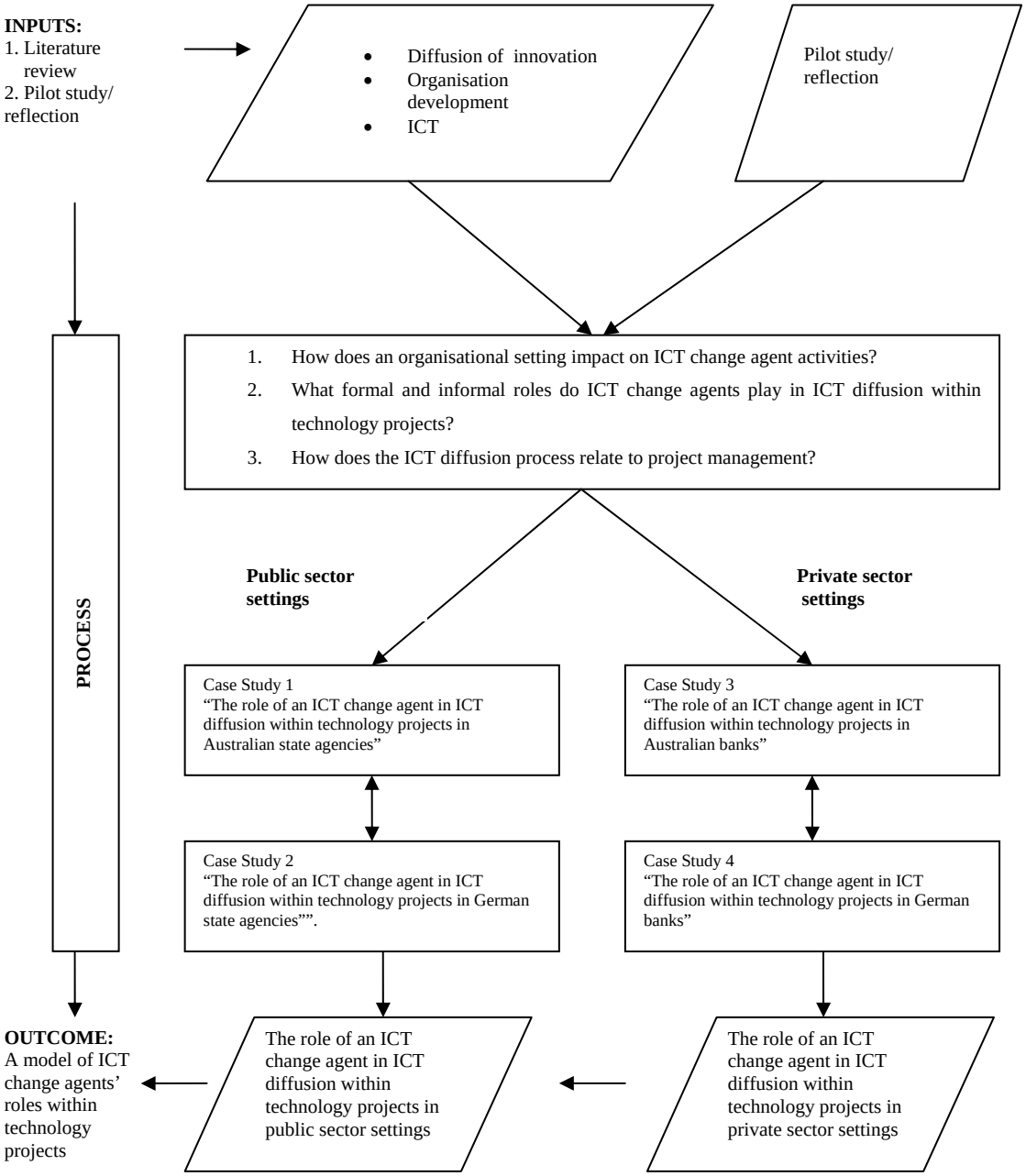
## 3.6. Research design

This research is designed using an Input-Processing-Output model presented in Figure 3. As an analogy with a computer model, Simon (2001, p. 168) proposes that "In information technology, input refers to data and programs entered into the computer for some form of manipulation or processing. … Output refers to the information produced by the computer as a result of the processing. … The processing activities, which are usually the reason for using the technology, are dependent on data and programs being brought in (input), with the results of the processing later provided in a desired form (output)".

Figure 3 displays the various elements mentioned in previous chapters. These elements are entitled inputs, process and outcomes. "Inputs" refer to known bodies of literature and my own experience resulting in the research questions. "Process" refers to four constructed case studies concerning the described public and private sector settings in Australia and Germany. The interrelated research questions will be addressed in those

case studies. “Output” of the computer model refers to the outcomes of this research – the potential models that will be derived from the case studies.

Figure 3: Design of the study




Adapted from Simon (2001)

## 3.7. Data collection

The data for this study will be collected through three primary data sets. The first primary data set consists of semi-structured interviews with change agents (see Section 3.7.1). The second primary data set is based on my own critical self-reflection (see Section 3.11.1). The third primary data set includes existing data such as change agents' reports, project presentations, project plans, emails and annual reports (see Section 3.12.1). All three data sets will be discussed next.

### *3.7.1. Semi-structured interviews*

Holstein and Gubrium (1995) write that the majority of researchers and professionals gather contemporary data via interviews.

> … the interview is one of the most widely used forms of interaction. An interview occurs when there is planned conversation (give-and-take) between two (and, at times, more) people. We can say that a conversation is planned, or focused, if one of the participants has a preestablished purpose for the exchange (Hunt and Eadie, 1987 p. 4).

The semi-structured interviews intend to capture change agents' professional work experiences. The interviews will include questions about roles and diffusion elements during distinct project management stages (outlined in Chapter Two) related to the outcomes of ICT projects. A set of guiding questions will be used to encourage the discussion (Jones, 1996). The researcher explains the terminology to the change agents, "… but otherwise respects how the participant frames and structures the responses" (Marshall and Rossman, 1989 p. 82). To ensure a consistent interview technique each interviewee will be asked the same questions (Weller and Romney, 1988).

In the interviews, respondents will be asked to report on their official job title and the roles they may have performed during the different project stages. Furthermore, the participants will be encouraged to describe the particular ICT innovations that they had initiated, managed or diffused. Other questions will focus on communication channels,

time periods and social system. Yin (1989) concludes that interviews provide evidence of the human element in the case studies. Gaskell (2000) suggests that: "… more interviews do not necessarily imply better quality or more detailed understanding". In other words, the quality of interview data is more significant than the number of interviews in the sampling process.

## 3.8. Sampling

The selection of an appropriate sample of ICT change agents for the four case studies for this research was one of the most important issues. This study is concerned with the exploration of insights into change agents' activities. Particularly, this research was looking for business settings focusing on the ICT change agents' perspectives. The main participants in this study were drawn from change agents who have operated in ICT projects within state agencies and banks in Australia and Germany. Internal or external change agents who have worked or are currently working on ICT projects at MMV, VLA and SRO Victoria were approached, as well as the change agents involved in ICT projects at ANZ, CBA and NAB within the State of Victoria in Australia. Similarly, in Germany change agents were identified who have worked or are currently working in the ICT projects at HZD, HSM and HMDF, as well as change agents involved in ICT projects at DB, CB and DreBa within the State of Hessen in Germany. The sampling process aimed to engage four change agents from six target state agencies and six banks, making the sample forty-eight in total.

Flick (1998) emphasises that the choice for a qualitative method has an impact on the sampling strategy. The qualitative approach, applied in this research, focuses on particular business environments and key individuals who are not specifically named "change agents" in organisations and belong to the group of a hidden population. So, the identification of appropriate participants is difficult. Henry (1990, p. 21) concludes that: "Often snowball sampling is used when a population listing is unavailable and cannot be compiled by researchers". In this case, it does not make sense to conduct a

random selection in this study in an attempt to include key individuals. Subsequently, this research looks at a special population and adopts a snowball sampling approach to recruit change agents in Australia and Germany.

> Snowball sampling (also called network, chain referral, or reputational sampling) is a method for identifying and "sampling" or selecting the cases in a network. It is based on an analogy to a snow-ball, which begins small but becomes larger as it is rolled on wet snow and picks up additional snow. Snowball sampling is a multistage technique. It begins with one or a few people or cases and spreads out on the basis of links to the initial cases (Neuman, 1994 p. 199).

Snowball sampling employs two different strategies. Firstly, the initial group of change agents, with whom I worked in ICT projects in Germany, was approached and asked to provide the information needed to locate other change agents within state agencies and banks in Germany. Some of the identified change agents in Germany also had contacts with change agents in Australia. Secondly, some of my contacts in Australia were working or were employed by selected organisations. These informants and change agents were targeted to provide names of other change agents. This approach created a snowball effect as each of my key contacts were able to suggest other change agents who could participate in the semi-structured interviews in Australia and Germany. Some of the subjects had direct social contact with each other. Others were embedded in the same change agents' network without knowing each other. This network structure existing of social relationships among the change agents is entitled "sociogram" and is an appropriate technique for the presentation of strategy of snowball sampling (Neuman, 1997 p. 207).

The study was conducted by the researcher in two phases after ethics approval by the University of Ballarat was granted: Phase One (Pilot study) and Phase Two (Main study).

## 3.9. Pilot study

In the pilot study, four Australian and four German technology change agents participated. The pilot study aimed to investigate the extent to which the terminology, questions and the interview process were meaningful to the change agents. This preliminary exploration helped to refine the interview questions before proceeding to the main study.

The pilot study confirmed the methodological direction of this research. Initial discussion with participants confirmed that change agents play varying formal and informal roles to meet their customer demands. In some cases, the informal social contacts led to the formation of an informal network. In terms of the snowball sampling technique developed for this study, the interviewees expressed a willingness to provide the names of other change agents to ensure the size of the case study sample. Furthermore, the pilot study showed that some of the employees of one of the Australian banks were using self-reflection which is a significant part of my methodology. Critical feedback from participants led to the modification of the interview structure. Before the pilot study, I intended to carry out the main study in Germany first and afterwards in Australia. During the pilot study, I became aware that Australian change agents were keen on participating in this study immediately and were ready to recommend further participants. Therefore, I changed the schedule for the main study and conducted the Australian case studies first. It emerged that there were two different types of ICT change agent: project and operational. The main study focused only on change agents with ICT project experience. All potential participants received guiding questions before an interview to make sure that they had ICT project experience.

## 3.10. Main study

The main study was conducted face-to-face or via telephone with participants in Australia and Germany. The interviews with Australian participants were conducted in

English; the interviews with German participants were conducted in German. General research documents such as invitation, interview questions and after interview statement and consent for participation were translated by a professional translator. However, “A translation of as difficult a nature as this cannot be carried out by a professional translator, but only by a person who, in addition to being familiar with the language, is thoroughly at home both in the relevant literature and the institutional environment where the original work was undertaken” (Hagerstrand, 1967 p. v). In other words, it was more appropriate that I translate the German transcripts into the English language because I had worked as a technology change agent in those target organisational settings in Germany. My translations were verified by the software translation system embedded in Microsoft Word application.

The conversations took approximately 30 minutes and were audio-taped for transcription accuracy of the conversations and validity purposes. To protect participants’ identities, their names were coded and quotes were made anonymous. The transcripts of data produced in conversations and all other records (such as project documents) collected during the research process were aggregated for analysis purposes. Silverman (2005) suggests keeping a research diary in the sampling process because a research diary helps to develop awareness of the emotions and experiences of a researcher. Consequently, I made notes and reflected on my sampling journey.

## 3.11. Researcher’s background

The human dimension, or the way that an individual contributes to and is impacted by life change, is becoming an increasingly important element of research. In order to thoroughly understand the issue, it is useful to examine the findings of Quinn (1996) and Kotter (1996). Quinn (1996) discovered that to stay competitive globally, it is necessary that not only organisations but also individuals need to make radical changes.

I made many profound changes in both my private and business life as I was willing to step outside of well-defined boundaries. Until my 14th birthday, I had been living in different European countries. A lack of knowledge of certain languages developed my observation and nonverbal communication skills. At that time, I created various strategies to cope with radical change. This personal experience subsequently motivated me to experiment with new ideas in my business life and to take more risks. My strategies also encouraged others to undertake challenging steps in their lives.

Internally driven, I have made a transformation from an IT expert to the manager of ICT projects and processes. I willingly took risks to move from a well-established change agent job in the private sector to unknown territory in the public sector for learning purposes. Kotter (1996) highlights that the key to learning is lifelong learning: the ability to learn from one's own experiences through reflection and risk taking.

Rogers (1995, p. 28) finds that: "Change agents are often professionals with a university degree in a technical field". I graduated in information technology and had more than ten years of experience in the ICT innovation process. In that time period, I held varying change agent positions such as product manager, process manager, project manager, consultant, trainer and support engineer in ICT diffusion, striving to make the transition from my IT education to management. I worked on both internal and external ICT projects and processes in state agencies and banks in Germany. The competencies I developed were integrated as part of this research study. As a co-author in Jagodic and Ungerer (1998), I describe the process of implementation and workflow of a user-help-desk. That article includes a comparative study of different user-help-desk software systems, called trouble-ticket-systems, and was relevant to the investigation of project management stages and diffusion elements in public sector settings.

After being well-established as an ICT change agent, I was looking for a new challenge and left my corporate role in Germany to become a DBA candidate in Australia. As a former change agent, I was responsible for the outcome; in my new research role, I was

focused on the research process to obtain a potential outcome. This radical change challenged me to examine various issues that I took for granted as a practitioner, while also acquiring new theoretical knowledge in the field of diffusion of innovation, organisation development and ICT.

In the reflection papers that I wrote as part of my DBA program, I realised that my private and business life were closely intertwined. A similar approach is described by Edgar Schein, a seminal researcher on organisational behaviour, who points out that his private life has influenced his business decisions within an organisation (Quick and Gavin, 2000). McCracken (1988, p. 18) underlines that "… the investigator cannot fulfil qualitative research objectives without using a broad range of his or her own experience …". My own experiences as a change agent were gathered through the critical self-reflection process.

### *3.11.1. Critical self-reflection process*

Knowledge-based experience tends to be more difficult to codify and reproduce. Zaltman (1997) suggests that a systematic procedure needs to be developed to become aware of accumulated knowledge. This can be achieved through the reflection process which creates new knowledge (Brown, 2003; Dixon and Ross, 1999). While the reflection process is well established in the education literature, it is a relatively new analytical style in management research (Seibert and Daudelin, 1999).

Levi (1997, p. ix) examines reflection at the micro level in a pragmatic way, arguing that:

> Rational agents are responsible in deliberation for policing the coherence of their conclusions. Insofar as a self-critical agent invokes principles of rationality in rational deliberation to bring his or her own reflections under critical control and to determine which of the options available in a given setting are admissible relative to the agent's beliefs and values …

In other words, human beings have a capacity to critically assess their thinking, bringing this in relation to their personal convictions. According to Pardoe (2006, p. 7), this is possible with an active learning style, observing that:

> Recent research into learning and the emerging philosophies promote an approach to learning that focuses more on the 'active participant' than on the 'passive recipient'.

Therefore, Sims and Sims (2006, p. ix) suggest that educators "… will need to increase their understanding of how people learn … and the implications of individual learning styles to learning success". It has now been accepted that people learn in different ways by developing preferences for their individual learning styles (Mumford, 1990).

> In other words, effective learning will provide the learner with skills to resolve problems in new and future learning based on their previous learning experiences (Reid, 2005, p. 4).

Research on learning from experiences by Kolb (1984, p. 30) has shown that: "… learning is by its very nature a tension- and conflict-filled process". This tension came to light in the research process derived from the conflict between my practitioner background and performing a new role as an academic researcher. Relating to this, Wilms and Zell (2003) suggest that academics think differently than practitioners. For example, in Karena (2006), an interviewee Professor Monro discusses her experiences with universities and industry, concluding that universities are more focused on collaboration while industry is concerned with commercialisation.

In 1983, one of the scholars concerned with reflection in the United States of America presumed "… that practitioners may *become* reflective researchers in situations of uncertainty, instability, uniqueness, and conflict …" (Schön, 1983 p. 308). More than twenty years later, his prediction proved to be true in Australia as I started to reflect in response to my inner conflict related to different learning approaches as a former practitioner and now an academic researcher. To resolve this inner conflict regarding distinct learning approaches, I created an individual reflection model. My individual reflection model is built on the work of Boud, Keogh and Walker (1985); York-Barr,

Sommers, Ghere and Montie (2001); Shields and Edwards (2005); Reiff (2004) and de Bono (1970).

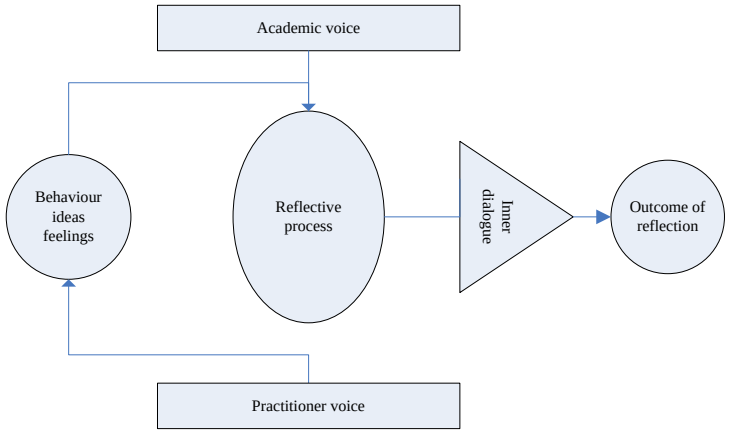
As depicted in Figure 4, my reflection model commences with the first two elliptical shapes illustrated by Boud, Keogh and Walker (1985). Certain behaviours, ideas and feelings sometimes call up events from the past. This review of past events can be visualised step-by-step. This reminiscence is a first step towards self-expression.

Research by Uccellani, Christos-Rodgers and Slan (2004, p. 115) has shown that the use of dialogue enhances the "… growth and self-expression" of an individual and "… the use of dialogue is welcomed by a democratic and populist tradition …" (Vella and Associates, 2004 p. 97). However, "Most of us must learn how to dialogue with ourselves … Although dialogue is often used to refer to interactions between people, it can also refer to a person's internal exploration of various viewpoints and assumptions– an inner dialogue" (York-Barr, Sommers, Ghere and Montie, 2001 p. 48). Jackson (2001) proposes that academics and practitioners need to engage in a dialogue. My inner dialogue consists of an academic researcher voice and a practitioner voice each representing a different role. Shields and Edwards (2005) suggest that dialogue is more than talk. Their dialogue model includes three elements: relationship, understanding and ontology (refer to the triangle in Figure 4). The dialogue starts with building a relationship. In the relationship, the distinct roles need to be established (Reiff, 2004). For example, research by de Bono (1970) recommends wearing various hats to symbolise different roles during the reflection process. Shields and Edwards (2005, p. 51) observe that a dialogue "… requires a certain space or distance …". One hat and chair are reserved for the academic role, another hat and chair for the practitioner role (refer to the rectangles in Figure 4).

These two hats mean that the same person engaged in an inner dialogue can be the researcher as well as the object of study. The dialogue commences spontaneously with the question about change agent activities emerging from an academic voice reflected in

wearing an academic hat and sitting on an academic chair. Before responding to an academic question, the academic hat and chair need to be exchanged with the practitioner hat and chair. On the practitioner chair, wearing a practitioner hat, the practitioner voice recalls the situation related to an academic question. These two voices listen to each other's different perspectives and languages. This approach is repeated until nothing new can be added to the discussion. Furthermore, this technique ensures that these two distinct roles learn from each other. Understanding each other's point of view enhances building the relationship and leads to the expression of a whole human being. This experience of the nature of being refers to the element entitled ontology in the dialogue picture. At the end of the dialogue, the academic voice describes the different ideas about what happened in technology projects and transfer them into the outcome of reflection. Figure 4 illustrates my self-created reflection model. This individual reflection model transformed my knowledge into empirical data for research analysis purposes.

Figure 4: Individual reflection model



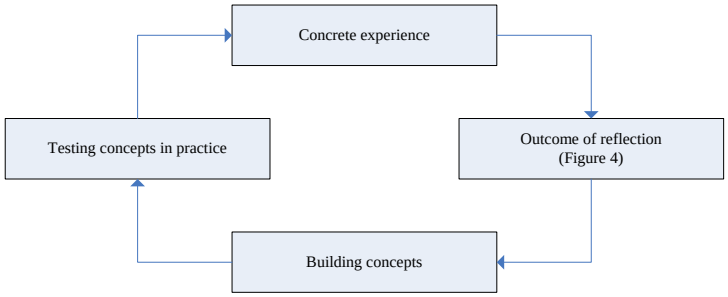

Adapted from Boud, Keogh and Walker (1985); York-Barr, Sommers, Ghere and Montie (2001); Shields and Edwards (2005); Reiff (2004); de Bono (1970)

Seibert and Daudelin (1999, p. 15) sum up "… that reflection is necessary for learning to occur, but … also acknowledge that reflection alone is not sufficient to produce learning from experience". Therefore, the reflection outcome was integrated into an ongoing cycle of experiential learning by Kolb (1984). Basically, his model builds on work from previous researchers such as Dewey (1910), Piaget (1968) and Lewin (1951). Kolb's (1984) empirical research concludes that individuals learn from their experiences and that this is a significant aspect towards theory building.

Figure 5 outlines his (Kolb, 1984) cycle of experiential learning including reflection, building concepts and testing concepts in practice that lead to concrete experience. The outcome of the reflection model, demonstrated in Figure 4, was placed into the cycle of experiential learning. In Figure 5, the outcome of reflection was the starting point that assisted me to draw the conclusion regarding my roles as a former change agent within technological projects. In the conclusion, the roles were identified and built into the concept. Having reached the conclusion about my change agent's behaviour, I recalled if that pattern also occurred within targeted state agencies and banks in Germany. If this has confirmed my conclusion, I captured concrete experience of my own roles as a change agent in Germany at the end of the cycle. In the case that the test disconfirmed a proposed conclusion, I continued to apply Kolb's model above until the assumptions in the concept were valid.

Boud and Walker (1991, p. 9) underline that despite formal education, the individuals "… will not really be equipped for a position of responsibility unless they have the ability to learn from their experience". The experiential learning process assisted me to integrate my work experience into case studies.

Figure 5: Cycle of experiential learning




Adapted from Kolb (1984)

## 3.12. Data analysis

Qualitative data were analysed in the case studies. Case studies provided an empirical understanding of change agents' formal and informal activities in public and private sector settings in Australia and Germany. George and Bennett (2005, p. 19) argue that:

> Case studies allow a researcher to achieve high levels of conceptual validity, or to identify and measure the indicators that best represent the theoretical concepts the researcher intends to measure.

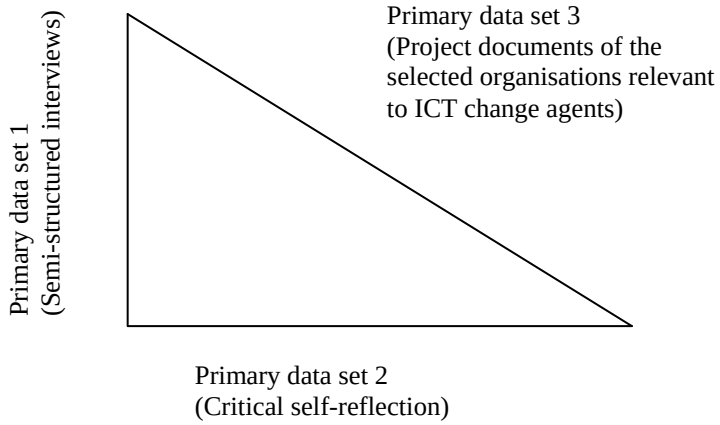
In other words, case studies shape theoretical constructs which are discovered through the empirical data. By way of illustration, the reliability and validity of the case study data were enhanced through triangulation and pattern-matching.

### *3.12.1. Triangulation*

Triangulation integrates distinct methods with the aim to intensify the reliability and validity of data (Miller and Fredericks, 1996; Tashakkori and Teddlie, 1998). Denzin (1989) points out the importance of data triangulation in terms of applying different data sources gained through separate methods. Figure 6 shows triangulation in this study by combining three distinct primary data sets. The first primary data set consists of semi-structured interviews with change agents. The second primary data set is made up of my

critical self-reflection data. The final primary data set incorporates existing data such as emails, project plans, project statistics, project concepts, company reports, government reports and ICT project presentations provided by selected change agents within state agencies and banks in Australia and Germany.

Figure 6: Triangulation




The three distinct data sets underpin triangulation by mapping distinct constructs which have a strong link between them. These links serve the purpose of bringing the change agents' experiences together into a congruent whole that closely fits together.

## *3.12.2. Pattern-matching*

Case studies ascertain the constituents of distinct patterns which can be linked to equal contender.

> For case-study analysis, one of the most desirable strategies is the use of a pattern-matching logic. Such a logic compares an empirically based pattern with a predicted one (or with several alternative predictions). If the patterns coincide, the results can help a case study to strengthen its *internal validity* (Yin, 1989 p. 109).

Various roles of change agents have been discussed in the bodies of literature on diffusion of innovation, organisation development and ICT. Table 3 assists in building a framework for the pattern-matching process by showing the predicted roles from the literature review and comparing those with empirically examined ones.

Table 3: Potential pattern-matching

| **Change agents' roles in:** | **Predicted roles from the literature review** | **Empirically examined roles from the semi-structured interviews** |
|---|---|---|
| Diffusion process | Teachers, consultants, salespeople, linker, marketer, initiator, relationship builder, diagnostician, motivator, promoter, stabiliser and terminator | Under investigation |
| Informal networks | Central connectors, boundary spanners, gatekeepers, bridges, knowledge and power promoters | |
| Organisational structure | Supervisor, manager, trainer, developer, adviser and consultant | |
| Organisational culture | Tempered radicals | |
| Organisational processes | Catalyst, collector of information, planner of technical training and consulting, facilitator, transducer, identifier, net-worker and team builder | |
| Project management | Project manager, facilitator, communicator and virtual project manager | |
| ICT innovation | Project manager, Chief Information Officers, ICT professionals, information system consultants and information systems department | |

## *3.12.3. Qualitative data analysis*

Drawing on the qualitative data analysis work of Miles and Huberman (1994), the process includes the reduction and display of collected data. Reduction required that all transcripts, project documents and notes needed to be viewed many times. Each time, a variety of key words emerged from the data which were then used to build phrases towards conceptual framework. The phrases were set out in tables and allowed for a comparison of each case. During the process of data comparison, vague conclusions occurred that need to be modified using grounded theory (Glaser and Strauss, 1967). Consequently, qualitative data analysis was an interactive process which was repeated many times until nothing new could be added. The interactive data analysis model and

grounded theory were compatible in terms that both techniques supported inductive discovery of theory from comparison of empirical data.

The cases based on empirical data in the case studies formed the basis for the development of a general theory. Theory is beneficial if it contributes to the acquisition of knowledge and practical know-how (Craib, 1984). In this research, grounded theory aided to develop a new model from empirical data using the inductive technique. As a former practitioner, I selected grounded theory because "… grounded theory pushes its practitioners toward theoretical interpretations. Thereby they have obligations to contribute to the knowledge of their respective disciplines or professions" (Strauss and Corbin, 1998 p. 174). In the same vein, Seale (1999, p. 87) confirms that:

> … researchers can use this experience as a resource for research purposes, reinterpreting concepts in ways that the original thinker could not have predicted, applying them in novel ways to new areas …

Grounded theory has been developed by Glaser and Strauss (Glaser and Strauss, 1967; Strauss and Corbin, 1997). In grounded theory, conclusions are developed from the field data which need to be compared with further data to build a theory (Glaser and Strauss, 1967). In the words of Strauss and Corbin (1990),

> A **grounded theory** is one that is inductively derived from the study of the phenomenon it represents. That is, it is discovered, developed, and provisionally verified through systematic data collection and analysis of data pertaining to that phenomenon. Therefore, data collection, analysis, and theory stand in reciprocal relationship with each other. One does not begin with a theory, then prove it. Rather, one begins with an area of study and what is relevant to that area is allowed to emerge (Strauss and Corbin, 1990 p. 23).

Grounded theory is particularly concerned with theory-building and incorporates context specific settings. In this research, each case was analysed independently to extrapolate the insights of change agents' activities.

Some researchers use qualitative software to enhance coding (Ezzy, 2002; Popping, 2000; Fielding and Lee, 2000). However, Coffey and Atkinson (1996, p. 142) rule out that theory can be built "… by the aggregation and ordering of codes or the retrieval of coded segments". Therefore, Coffey and Atkinson (1996, p. 166) argue "... that no single software package can be made to perform qualitative data analysis in and of itself". Therefore, the cases were presented in tables with identical headings in every case study. Case studies were underpinned by broad categories based on two classifications, such as state agencies and banks in Australia and Germany, that allowed for the comparison of case studies. The case studies were analysed and interpreted using Roger's (1995) diffusion model and project management framework (Western Australian Innovation Centre, 2005). The roles of the change agents and diffusion elements were analysed by looking for patterns. Comparisons were made among the change agents' practices in public and private sector settings. This approach highlighted similarities and differences among the change agents' operations. As a result, the model of change agents' activities emerged from the data.

## 3.13. Conclusion

This case study methodology combines different methods and endeavours to inform practice and theory. The case study methodology is grounded in four thematically linked case studies which aim to identify the patterns of change agents' activities. A mixed method approach is applied to the case studies to investigate the behaviour of change agents. The empirical data was gathered via semi-structured interviews with the change agents, project documents and my critical self-reflection papers. Triangulation strengthens the reliability and validity of these distinct data sets. The data sets are analysed by applying the grounded theory. Prior to this, the snowball sampling sets the scene for the selection of the change agents within state agencies and banks in Australia and Germany.

# 4. CHAPTER FOUR: SNOWBALL SAMPLING PROCESSES

## 4.1. Introduction

In the previous chapter, the snowball sampling strategy was highlighted as the key approach for the data collection process in public and private sector settings in Australia and Germany. In this current chapter, the sampling processes are specified. The sampling processes are visualised by sociogram techniques as discussed by Neuman (1997), followed by tables which illustrate the sampling evolution.

Ahead of the interviews, ICT change agents were invited to participate via e-mail. With every personal e-mail three different standard documents, such as, formal invitation, interview questions and consent for participation consisting of one page each, were attached. This standard process was determined based on feedback from participants from the pilot study. The pilot study conducted with four Australian and four German change agents attempted to build a basis for the snowball sampling in the main study.

In the main study, tables (4-7) consist of five distinct columns. At the top of the tables, the column “Individuals in the sampling process” describes the behaviour of people who were engaged in this study. Those people are categorised in four different groups. The first group includes acquaintances who tried to help towards building a first snowball by naming potential participants. Those acquaintances preferred to remain anonymous and are called “Informants (I)”. The second group comprises individuals who agreed to be named in the recruiting process or explained the research to target participants ahead of the formal invitation. Those people are entitled “Actors (A)”. The third group are actual participants in the research and labelled “Change agents (CA)”. The last group consists of invited participants who declined the invitation or did not respond; they are named “Non-Participants (NP)”. In the second column of the tables, “Behaviour” relates to the role of the aforementioned people. The role can be active or

passive. Individuals with active roles encouraged others to participate. In contrast, passive people kept silent in the recruitment process. In the third column, “Behaviour led to recruitment of potential participants (Yes/No)” displays whether the suggested change agent agreed to participate in this study. In the fourth column, “Female (F)/ Male (M)” underlines the gender of informants, actors, participants and non-participants. The final column, “Interview type”, demonstrates if an interview was conducted on the phone or face-to-face.

## 4.2. Sampling process in Australian state agencies

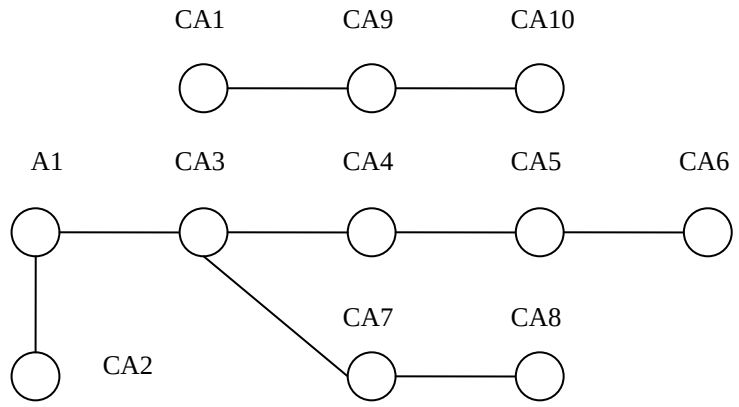
Change agents from the pilot study were invited to participate by email in order to build a snowball. However, the first emails sent out could not reach the intended recipients and bounced back undelivered. It emerged that all three targeted change agents had resigned from their jobs and people contacted in those organisations were not willing to disclose their forwarding addresses. This required significant reflection on the process of obtaining participants. On reflection, a private mobile number of one of the change agents who had left his job was found. As Figure 7 shows, he (CA1) was the first change agent who participated in an interview. CA1 was willing to seek out the contact details of another change agent who terminated his position after participating in the pilot study. However, it turned out to be difficult to find the locality of that change agent. Based on this, CA1 recommended another change agent who did not respond to the e-mails. An effect of this was that the snowball base needed to be built up on distinct organisational levels from scratch again.

One of the acquaintances (A1) named two change agents within MMV and VLA settings. A1 permitted his name to be used to attract recommended change agents via invitation e-mail. As Figure 7 illustrates, both invited change agents, CA2 and CA3, participated in interviews. While CA2 could not name any participants, CA3 suggested another change agent (CA4) who agreed to be interviewed. CA4 recommended CA5 for an interview. CA5 had worked on a joint project with different change agents from

Legal Aid in NSW. Based on this, he named CA6 with extensive technological project experiences within Legal Aid settings in NSW, who participated in the study. After reaching the sampling quota within Legal Aid settings, other change agents were not able to nominate any further participants, so I went to Europe to conduct interviews with German change agents.

At the end of the research process in Germany, the first Australian participant identified the targeted change agent (CA9) from the pilot study who agreed to be interviewed when I came back. Upon returning from Germany, I was able to develop constructive relationships with CA3 and CA9 who enlisted more participants for this study. CA3 recommended CA7 who agreed to be interviewed. After the interview, CA7 could not locate any experienced change agent within technological projects in SRO. Because of this, CA7 suggested a change agent within a non-targeted state agency who was in the same building as SRO, and had extensive ICT project experiences. The interviewed change agent (CA8) confirmed the already identified patterns. At the same time, CA9 recommended CA10. As the interview data with CA10 within SRO settings had a repetitive nature, there was no benefit derived from conducting further interviews. Figure 7 displays an overview of the described snowball sampling process above.

Figure 7: Snowball sampling in Australian state agencies



The detailed information about actor (A1) and change agents (CA1-CA10) as depicted in Figure 7 is described in Table 4. Three informants (I1-I3) revealed the contact details of potential participants who did not participate in this study. The snowball started to roll as actor (A1) recommended two participants. Some participants supported the sampling process by suggesting other change agents. However, some change agents did not participate. To sum up, 16 potential participants were invited. Of the 16 potential participants, ten change agents participated, three change agents declined to participate, two potential participants did not respond to invitations and one change agent responded after the sampling quota with the particular state agency was achieved. All ten change agents who participated were men. Of the ten participants, seven were internal and three were external change agents. Seven change agents required face-to-face interviews while three preferred to speak on the phone. The data collection with change agents in state agencies in Australia took about 9 months.

Table 4: Sampling process in Australian state agencies

| **Individuals in sampling process** | **Behaviour** | **Behaviour led to recruitment of potential participants (Yes/No)** | **Female (F)/ Male (M)** | **Interview type** |
|---|---|---|---|---|
| I1 | Passive/ suggested NP4 | No/ NP4 declined invitation | F | |
| I2 | Passive/ suggested NP5 | No/ NP5 did not respond | M | |
| I3 | Passive/ suggested NP6 | No/ NP6 declined invitation | M | |
| A1 | Active/ referred to CA2 and CA3 | Yes | M | |
| CA1 | Active/ referred to CA9, NP1 and NP2 | Yes | M | Phone |
| CA2 | Passive/ no recommendation | No | M | Phone |
| CA3 | Active/ referred to CA4, CA7 and NP3 | Yes | M | Face-to-face |
| CA4 | Active/ referred to CA5 | Yes | M | Face-to-face |
| CA5 | Active/ referred to CA6 | Yes | M | Face-to-face |
| CA6 | Passive/ no recommendation | No | M | Phone |
| CA7 | Active/ referred to CA8 | Yes | M | Face-to-face |
| CA8 | Passive/ no recommendation | No | M | Face-to-face |

Table 4: (continued). Sampling process in Australian state agencies

| Individuals in sampling process | Behaviour | Behaviour led to recruitment of potential participants (Yes/No) | Female (F)/ Male (M) | Interview type |
|---|---|---|---|---|
| CA9 | Active/ referred to CA10 | Yes | M | Face-to-face |
| CA10 | Active | No, because the interview data repeated | M | Face-to-face |
| NP1 | Passive/ did not respond | No | F | |
| NP2 | Passive/ declined invitation | No | M | |
| NP3 | Passive/ replied after the sample quote within target organisation was reached | No | F | |
| NP4 | Passive/ declined invitation | No | M | |
| NP5 | Passive/ declined invitation | No | M | |
| NP6 | Passive/ did not respond | No | F | |

Table 4 discloses that the presence or absence of a recommender name in an invitation had an impact on the potential participants' behaviour. Those who reflected through their behaviour that they supported the study were classified as active. The active role was reflected in greeting potential participants through the invitation e-mail or asking change agents if they were interested to participate. This attached importance to the study. Active behaviour in most cases reciprocated participation. In contrast, change agents declined invitations or did not reply if they noticed the absence of a recommender name. So, in the sampling process within Australian state agencies, I became aware of the process of relationship building that would be required for seeking out other change agents within banks in Australia.

## 4.3. Sampling process in Australian banks

As a result of the pilot study, it was evident that the interview conducted with the participant was on an operational level. Therefore, the recruitment process needed to be formed from scratch again, for example, through attending networking events. In the

first networking meeting for women, one of the women named three potential participants.

One of the change agents replied:

> … I hope this email finds you well and I do apologise for not getting back to you until now. I will be forwarding your email onto 2/3 possible respondents in … whom I feel are well placed to participate … (I4)

Although invitations were repeated, none of the targeted change agents replied. At the presentation of one of the change agents within a large company, which employs various types of change agents, I invited the presenter to participate in an interview. However, after a few days, he declined the invitation arguing:

> … thank you for your email. Unfortunately we are not in a position to discuss projects of any nature regarding our clients, without their express agreement and authority, which is very standard in our industry … Apologies again, we cannot be specific about the client names you have requested … (I7)

Similarly, on another occasion, it became obvious that external change agents were not willing to talk about their bank clients. Prior to this, one of the potential German participants who had established a good relationship with managers of one of the large American ICT companies was requested to recommend change agents in Australia. After a few weeks, he responded that it was too difficult to locate technological change agents in Australia. More generally, the branch manager of one of the targeted banks was asked to provide guidance. After taking my contact details, she emphasised how busy people were and if anyone would be interested to participate he or she would call back. After many attempts failed to recruit the first snowball of change agents within banks, reflection was initiated.

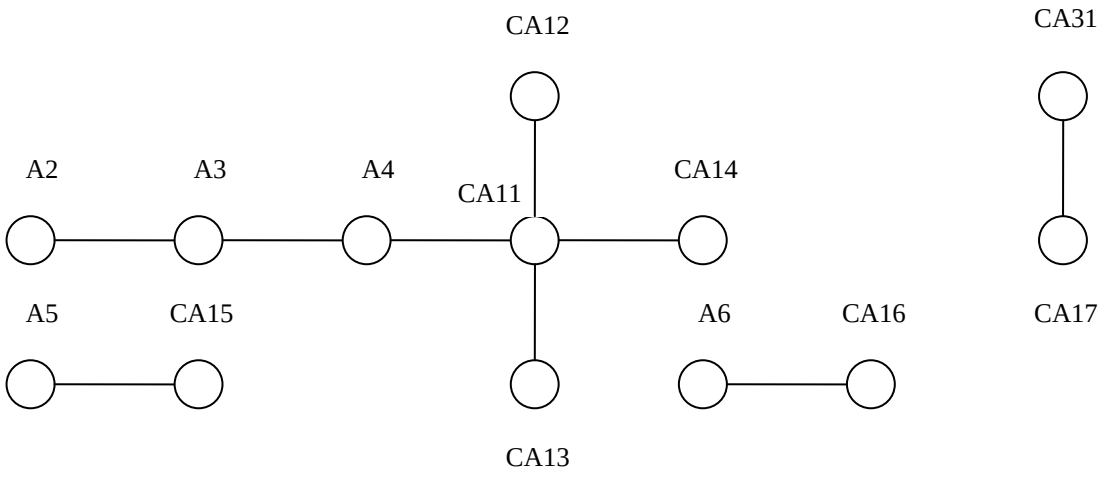
In the research process, many people were approached to nominate potential participants. As Figure 8 shows, three individuals were needed to conduct an interview with the first change agent (CA11). CA11 referred to CA12 from his company and CA13 from another bank, respectively, who participated in interviews. The last

participants could not recommend further change agents. Consequently, the internet and newspapers were searched to select some individuals from the target banks. After a week, the focus centred on three people at distinct organisational levels who were asked for guidance. Two of the three supported the study. The first actor (A5) urged CA15 to participate in an interview before the German data collection. In Germany, one of the participants (CA31) recommended CA17 who worked with a particular bank in Australia. CA17 participated in a face-to-face interview in Germany. After the completion of the German data collection, CA11 provided assistance to recruit CA14. Simultaneously, the actor (A6) encouraged CA15 to participate in an interview. After the interview with CA15, patterns emerged so that the data with CA15 had a repetitive nature, therefore, there was no benefit in continuing the snowball sampling process. Pansiri (2006, p. 229) confirms this by saying,

> When the researcher is satisfied that the data are rich enough and cover enough of the dimensions they are interested in, then the sample is large enough. In quantitative methods, required sample sizes can be calculated on the basis of the type of analysis that is anticipated. In qualitative analysis, it is difficult to predict accurately what the sample size will be. The sample is large enough when it can support the desired analysis.

Figure 8 displays an overview of the process described above.

Figure 8: Snowball sampling in Australian banks



While Figure 8 provides a map of actors (A2-A6) and change agents (CA11-CA17), Table 5 depicts the specific characteristics reflected in the outcomes of the sampling activities. Of the 14 invited change agents, seven participated, three declined to participate and 4 four potential participants did not respond to invitations. The data collection with change agents in banks in Australia was conducted in the same time period as discussed in the previous section on public sector settings and took about nine months.

Table 5: Sampling process in Australian banks

| **Individuals in sampling process** | **Behaviour** | **Behaviour led to recruitment of potential participants (Yes/No)** | **Female (F)/ Male (M)** | **Interview type** |
|---|---|---|---|---|
| I4 | Passive/ no recommendation | No | F | |
| I5 | Passive/ suggested NP8, NP9 and NP10 | No | F | |
| I6 | Passive/ suggested NP13 and NP14 | No | F | |
| I7 | Passive/ no recommendation | No | M | |
| I8 | Passive/ no recommendation | No | M | |
| A2 | Active/ referred to A3 | Yes | M | |
| A3 | Active/ referred to A4 | Yes | M | |
| A4 | Active/ referred to CA11 | Yes | M | |
| A5 | Active/ referred to CA15 | Yes | F | |
| A6 | Active/ referred to CA16 | Yes | F | |
| CA11 | Active/ referred to CA12, CA13, CA14 and NP12 | Yes/ 3 participated, one declined invitation | M | Face-to-face |
| CA12 | Passive/ no recommendation | No | M | Face-to-face |
| CA13 | Passive/ no recommendation | No | F | Phone |
| CA14 | Active | Reached sampling quota | M | Face-to-face |
| CA15 | Passive/ no recommendation | No | F | Phone |
| CA16 | Active | Interview data repeated | F | Phone |
| CA17 | Passive/ no recommendation | No | M | Face-to-face |
| NP7 | Passive | No | F | |

Table 5: (continued). Sampling process in Australian banks

| Individuals in sampling process | Behaviour | Behaviour led to recruitment of potential participants (Yes/No) | Female (F)/ Male (M) | Interview type |
|---|---|---|---|---|
| NP8 | Passive/ declined invitation | No | F | |
| NP9 | Passive/ did not respond | No | M | |
| NP10 | Passive/ did not respond | No | M | |
| NP11 | Passive/ declined invitation | No | M | |
| NP12 | Passive/ declined invitation | No | F | |
| NP13 | Passive/ did not respond | No | M | |
| NP14 | Passive/ did not respond | No | M | |

In the sampling process within Australian banks, I have learned that personal recommendations led to the sampling evolution. As a result, I refreshed contacts with German change agents within public sector settings.

## 4.4. Sampling process in German state agencies

In contrast to the Australian snowball sampling as discussed in previous sections, I already had contacts with various change agents who worked with me on past technological projects. Initially, different change agents were approached to recruit a first snowball. With some change agents I had not made contact for years, so I did not know their current positions. Two change agents declined invitations because they were not operating within technological projects as their e-mails suggest:

> ... I am pleased that you remembered me. In the last few years I did IT security and facility management. The project management was not the core business … (NP15)

> … unfortunately, I have to advise you that in the meantime I have undertaken other tasks and I am not any more available for the IT project management. In this respect, I think that my participation in your interview would not be designated as the target you seek to achieve … (NP16)

As Figure 9 illustrates, I conducted the first interview with the change agent CA18. Subsequently, CA18 referred to CA19, CA20 and CA21 who participated in the interviews. CA21 recommended CA22 who agreed to be interviewed. On the way to interviews, I met CA23 who participated in my study, but could not recommend another change agent. Therefore, I approached CA24 who agreed to an interview but could not recommend anyone to recruit a sample within another state agency. Located CA25 participated in the interview and recommended CA26, CA27 and CA28 who agreed to be interviewed. CA28 referred to the CA29 who participated in the study.

Figure 9: Snowball sampling in German state agencies

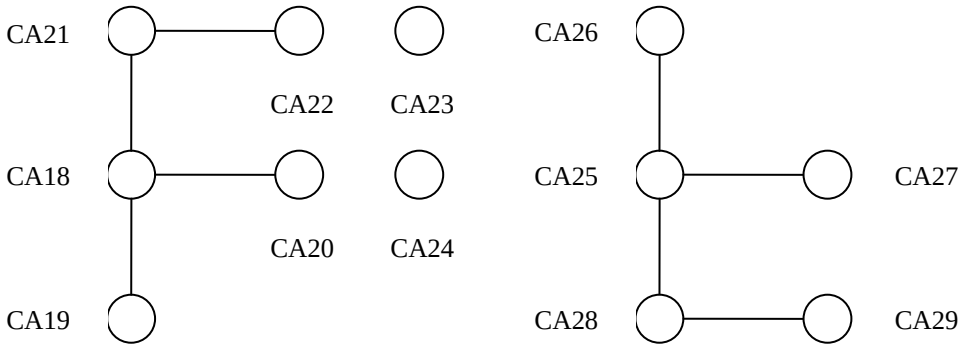



Figure 9 reveals the behaviour of change agents (CA18-CA29) in the snowball sampling process within targeted German state agencies, whereas Table 6 aggregates the evolution of the sampling process and shows 20 potential participants who were invited for interviews. Of the 20 targeted participants, 12 change agents participated, two change agents declined to participate and six potential participants did not respond to my invitations. The data collection with German change agents in public sector settings took about three months.

Table 6: Sampling process in German state agencies

| **Individuals in sampling process** | **Behaviour** | **Behaviour led to recruitment of potential participants (Yes/No)** | **Female (F)/ Male (M)** | **Interview type** |
|---|---|---|---|---|
| CA18 | Active/ referred to CA19, CA20 and CA21 | Yes | M | Face-to-face |
| CA19 | Passive/ no recommendation | No | M | Face-to-face |
| CA20 | Passive/ no recommendation | No | M | Face-to-face |
| CA21 | Active/ referred to CA22 | Yes | M | Face-to-face |
| CA22 | Passive/ no recommendation | No | M | Face-to-face |
| CA23 | Passive/ no recommendation | No | M | Face-to-face |
| CA24 | Passive/ no recommendation | No | F | Face-to-face |
| CA25 | Active/ referred to CA26, CA27 and CA28 | Yes | M | Face-to-face |
| CA26 | Passive/ no recommendation | No | F | Phone |
| CA27 | Passive/ no recommendation | No | M | Face-to-face |
| CA28 | Active/ referred to CA29 | Yes | M | Face-to-face |
| CA29 | Active | Reached sampling quota | M | Phone |
| NP15 | Passive/ declined invitation | No | M | |
| NP16 | Passive/ declined invitation | No | M | |
| NP17 | Passive/ did not respond | No | M | |
| NP18 | Passive/ did not respond | No | M | |
| NP19 | Passive/ did not respond | No | F | |
| NP20 | Passive/ did not respond | No | M | |
| NP21 | Passive/ did not respond | No | M | |
| NP22 | Passive/ did not respond | No | M | |

Simultaneously with the interviews in state agencies, the sampling process with change agents within technological projects in three large German banks took place.

## 4.5. Sampling process in German banks

At the beginning of November 2006, many change agents were busy concluding their tasks for the end of the year. Therefore, they postponed interviews and were not able to recommend other change agents to participate. As Figure 10 suggests many attempts failed to build a snowball. As a result, many change agents at distinct organisational levels were approached who had worked with me in previous technological projects. The first participant CA30 recommended CA31 who agreed to be interviewed. CA31 referred to a change agent who had extensive change agent experience within technological projects in a target bank in Australia (see Figure 8). After the interview, CA32 referred to the change agent who replied after I had completed the data collection in Germany. CA33 participated in my study and recommended CA34 who agreed to the interview. After the interview, CA34 referred to CA35. CA36 could not locate any potential participants. After the interview CA37 recommended CA38. I conducted the interview with CA39 who was not able to provide me with any contact details of other change agents. After the interview, CA40 recommended a change agent who said to her that he would participate in my study. However, he did not reply to my e-mails. So, another change agent who was not target participant referred to the last change agent CA41.

Figure 10: Snowball sampling in German banks

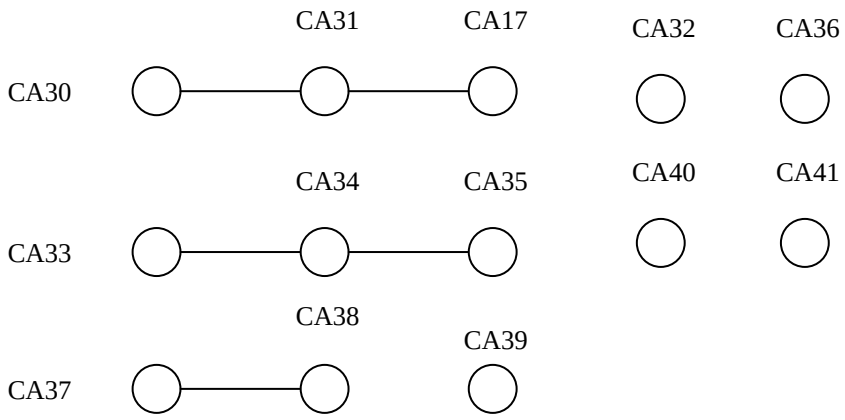


Figure 10 visualises the behaviour of change agents (CA30-CA41) in the snowball sampling process within target banks in Germany, while Table 7 details the evolution of the sampling process and illustrates 16 potential participants who were invited for interviews. Of the 16 invited people, 12 change agents participated, one change agent declined to participate, two potential participants did not respond to my invitations and one change agent answered after the sample quota was reached. The data collection with change agents in banks was occurring in the same time period as within public sector settings and took about three months.

Table 7: Sampling process in German banks

| **Individuals in sampling process** | **Behaviour** | **Behaviour led to recruitment of potential participants (Yes/No)** | **Female (F)/ Male (M)** | **Interview type** |
|---|---|---|---|---|
| CA30 | Active/ referred to CA31 | Yes | M | Face-to-Face |
| CA31 | Active/ referred to CA17 (Australian CA, see Table B) | Yes | M | Face-to-face |
| CA32 | Passive/ suggested NP25 | No | F | Phone |
| CA33 | Active/ referred to CA34 | Yes | M | Phone |
| CA34 | Active/ referred to CA35 | Yes | M | Face-to-face |
| CA35 | Passive/ no recommendation | No | M | Face-to-face |
| CA36 | Passive/ no recommendation | No | M | Face-to-face |
| CA37 | Active/ referred to CA38 | Yes | M | Face-to-face |
| CA38 | Passive/ no recommendation | No | M | Phone |
| CA39 | Passive/ no recommendation | No | M | Phone |
| CA40 | Passive/ suggested NP26 | No | F | Face-to-face |
| CA41 | Active | Reached sampling quota | M | Phone |
| NP23 | Passive/ declined invitation | No | M | |

Table 7: (continued). Sampling process in German banks

| Individuals in sampling process | Behaviour | Behaviour led to recruitment of potential participants (Yes/No) | Female (F)/ Male (M) | Interview type |
|---|---|---|---|---|
| NP24 | Passive/ did not respond | No | M | |
| NP25 | Passive/ responded after the sampling quota was reached | No | F | |
| NP26 | Passive/ did not respond | No | M | |

## 4.6. Conclusion

The sampling process has been a catalyst for change which is reflected in varying transformations. At the beginning, I transformed myself from European practitioner into "Australian academic researcher" then to "Australian and German practitioner" at the same time and at the end of the journey back to "Australian academic researcher". These processes drove me to examine the patterns of behaviour of participants and widen my mental horizon. Nevertheless, acting outside an organisational structure in a new role as researcher in Australia and Germany involved uncertainty and required courage, patience and persistence. In that process, I needed simultaneously to apply old skills and learn new ones such as networking and strategic thinking regardless of different environments. After a well-planned rationalist strategy failed to recruit change agents, an incremental approach based on learning-by-doing was practiced.

A number of people at different organisational levels were approached to provide names of different change agents in Australia. The informants gave me potential participants' names, nevertheless, they requested to remain anonymous in e-mails. So, invited change agents declined invitations or did not respond. As a result, I centred on active individuals who encouraged change agents to participate. Due to their pro-active behaviour towards this study, these individuals were labelled actors who led to the

recruitment of change agents in public and private sector settings in Australia. In contrast, in Germany, I already had many contacts with change agents from my previous work experience and did not require the guidance of actors.

The lack of a significant job title and corporate image made the entire sampling process messy and challenging. An effect of this was that I needed to rely on key individuals for the purpose of recruitment in both countries. The building of personal relationships was a prerequisite for the recruitment of change agents. The various divergent roles performed by change agents had a significant impact on the behaviour of potential participants. It was possible to identify patterns in the behaviour of the active and passive change agents. Those who agreed to be interviewed were more likely to be recommended by active participants. In contrast, those who did not reply to the e-mails or declined invitations were suggested by passive change agents. In most cases, the active behaviour led to snowball sampling, whereas, passive roles temporarily discontinued the entire sampling process and I needed to reflect and re-examine the sampling approach. The individual reflection model (see Figure 4) had multiple purposes. In the first place, the reflection helped to cope with running emotions, which triggered a learning process. The learning process built a basis for the recruitment of change agents within six target organisations in Australia and six proposed companies in Germany.

In Australia and Germany, 41 change agents participated, 14 did not respond, nine declined the invitation and two replied after the sampling quota was reached. Due to the fact that I have never worked in Australia, I needed the assistance of actors to recruit initial change agents while building relationships with various people in public and private sector settings; for this reason, the Australian sampling process lasted three times longer (about nine months) than the German process (about three months). The assumption that women would participate or support this research because of my gender could not be confirmed. Most participants were men. The majority of participants

preferred face-to-face interviews. Conducted interviews will be discussed in the next chapter.

# 5. CHAPTER FIVE: ANALYSIS OF PUBLIC SECTOR CASE STUDIES

## 5.1. Introduction

This chapter presents the findings and analysis of two case studies within public sector settings in Australia and Germany. These case studies include three data sets: extracted information from interviews with change agents, project documents obtained and, also in the German case study, the final reflection paper from a process of reflection regarding my change agent practices within German public sector organisations.

Table 8 shows keywords from the change agents' interviews and project documents within state agencies in Australia and Germany. Selected keywords from transcripts fall into two categories labelled as "Main" and "Supportive". As discussed in the methodology chapter, main keywords were composed of phrases related to elements of the conceptual framework. Therefore, these phrases have been set up as headings in the tables depicted for each case study; they have served as guidance in the process of analysis. In addition, the supportive keywords have enriched the main keywords.

Table 8: Keywords and phrases within ICT projects in public sector settings

| State agencies | Keywords from transcripts and documents | Phrases related to conceptual framework |
|---|---|---|
| Australia,<br>Germany | **Main keywords**<br>Change agent, formal, job, title, innovation, pilot, project, stage, core, work, role, time, new, idea, adoption, team, member, communication, channel, informal, network<br>**Supportive keywords**<br>Aims, structure, process, actors, spontaneous, benefits, n-tier, cost, reduction, efficiency, users, old, architecture, taxpayers, politically, external, internal, technical, government, purchasing, guidelines, governor, sponsor, pioneers, standard, procedures, experimentally, controversial, initiation, implementation, knowledge, vendor, manager, e-government, planning, relationship, influence, services, online, close-out, corridor, meetings, failure | Interview data within CA-No, change agent's type, formal job title, innovation type, pilot project, involved in project stage, core work at project stage, role at core project stage, core project stage time, suggested a new idea, adoption time of change agent's new idea, team member suggested a new idea, adoption time of team member's new idea, project communication, formal communication channel, informal communication channel, role within informal network |

The aforementioned approach allowed for a comparison of the different case studies. Consequently, every case study consists of two different types of tables related to (i) change agents' roles within the project management and (ii) ICT diffusion process.

In each case study, the tables representing the change agents' roles within the project management framework are set out in nine columns. At the top of the tables, the column "Interview data within CA-No' describes coded names of the participants, followed by the "Change agent type". The "Change agent type" column shows whether the change agent role is internal or external. In the third column, the table heading "Formal job title" indicates the official role of the change agent in accordance with organisational structure. The next column, "Innovation type", relates to whether the project is radical or incremental. Radical innovation is a new technology that has not been previously diffused, developed, managed or implemented in the particular organisation. In contrast, an incremental innovation is an update of a previous technology. The fifth column, "Pilot project", states if the technology innovation was tested before it was introduced within the main ICT project. The sixth column, "Involved in project stage", points out in which project management stages the interviewed change agent was engaged. The seventh column, "Core work at project stage", discloses at which project management stage that participant's work made a major contribution to the ICT project. The eighth column, "Role at core project stage", reveals what role the change agent played in that particular project management stage. The final column, "Core project stage time", indicates the estimated time period that was needed to complete the project management stage at which change agent did a main work.

ICT change agents' roles within the diffusion process are also listed in tables. These tables are set out in nine columns. At the top of these tables, the column 'Interview data within CA-No", as already mentioned above, draws up the list of coded names of the change agents. The second column, "Suggested a new idea", describes if a change agent suggested a new idea at the core project management stage, followed by the 'Adoption

time of CA's new idea' that indicates if a new idea was adopted by the targeted audience and if so the estimated time period over which it took place. In the fourth column, "Team member suggested a new idea", reveals if someone else from the project team suggested any new ideas. The next heading, "Adoption time of team member's new idea', points out the estimated time period that was needed when a new suggestion was adopted by the target audience. The sixth column, "Project communication" describes the project communication that occurred inside and/or outside an organisation. The table heading, "Formal communication channel", specifies the form of official communication, followed by the "Informal communication channel" that indicates the nature of the informal communication within a technology project. The final column, 'Role within informal network", states if a change agent used an informal network and, if so, what role he or she played.

Using these two types of tables, each case study will be examined separately in the following sections.

## 5.2. Case study 1

### *5.2.1. Setting the scene*

In setting the scene for the empirical analysis of ICT change agents' roles within technology projects in the Australian public sector, documents were consulted. The documents related to project planning guidelines, technical concept models, reports, organisational charts, newsletter for adopters, presentations, photos and publications. These documents together with ICT change agents' interviews and my personal conversation notes in the 12 Australian technology projects within three state agencies were included in the data analysis. It was evident that some of the interviewed ICT change agents were working in more than one ICT project.

The growing use of computers has made ICT a key issue within state agencies. Faced with the need to enhance both reliability and availability, many organisations are

examining their ICT infrastructure. Especially significant is that a number of applications "… build on the older architecture …" (CA7). Consequently, state agencies aim to update and automate a number of software functions. For example, by implementing a flexible application architecture, so-called "…N-Tier technology …" (CA7). An N-Tier application architecture provides a model that breaks up an application into tiers. As a result, organisations only need to modify a specific layer instead of rewriting the entire application.

To date, a strong focus on ICT within Victorian state agencies is visible in a large number of technology projects running simultaneously. A few of those projects are compulsory because organisations "… are running out of supported software …" (CA8). So, these projects ensure the validity of the service agreements.

Simultaneously, an entrenched organisational structure needs to be adjusted. One of the directors remembered "… a lot of work around process design and process development …" (CA10). In the same vein, another director confirmed that there was a change "… in the way that we delivered the services from the way that we did it previously …" (CA8). In this case, the workflow design included various organisational units. Existing units were required to monitor the impact of the project on their unit structure. Hence, many projects aimed to move the paper-based documents to an entirely electronic system. In this process, state agencies were looking to adopt "… a new industry best practice…" (CA8). So, the change agent explained, "…whenever we're embarking on a new project, the first thing we say is, 'Who's done it before?' … we really don't want to be pioneering …" (CA8). An effect of this is that the ICT projects are guided with benchmark principles and good practice indicators to bring "… more efficiency …" (CA5) into Australian state agencies. Nevertheless, the public sector aims to achieve more than the implementation of best practice. The new technology projects were also run for the purposes of "… cost reduction …" (CA1). In some projects, cutting-costs was achieved through new technologies that "… lock down the PC environment …" (CA8). This means that all ICT experts and users have the same standard computer

system which they cannot customise according to their individual needs. This practice is derived from various companies and "… big banks … and they are all moving into this new way of locking in the machine …" (CA8).

Initially, the formal public sector process was concerned with controlling of spending on new projects. One of the ICT change agents observed that the public sector is characterised by

> … spending taxpayers' … money, so with that in mind we have to be a lot more diligent about controls and the transparency with which we spend those moneys. So, there is a lot more control … to manage change … (CA7)

An effect of this statement is that before the initiation of an ICT project, the formal process of "…laborious government purchasing guidelines …" (CA8) needs to be considered which makes the whole formal process "… a little bit slower …" (CA10) than in the private sector.

Similar to the private sector, state agencies foster competition between different projects by presenting management awards to the best projects. The best projects feature high quality management standards manifested in a particular type of project document. These project management standards are also on the way to being established in other Australian state agencies. One of the public sector ICT change agents acknowledged, "…we have a formal structure for how we deliver this project … with Prince2 …" (CA7). Prince2 is the standard method for project management which is applied to ICT projects.

Also, ICT change agents within state agencies need to comply with the legal requirements and meet their obligations under the specified guidelines. One of the internal change agents reported that, "It had a huge influence on …" his work because he had "… to involve all these other groups …" (CA5) within the project management.

### *5.2.2. Change agents' roles within project management*

Table 9 shows the ICT change agents' roles within ICT projects in Australian state agencies. Relating to this, the table illustrates that of the 10 ICT change agents only three were external, and the rest internal. It is clear from the table that the most applied formal job title for a change agent was "Director", while "Managing Lawyer" was the least used. Five of the 10 ICT change agents had the formal role of director, followed by manager and project manager with two job titles in each. Regardless of the job title, change agents were engaged equally in radical and incremental innovation projects. Six out of 10 ICT projects commenced with the initiation stage without piloting. All 10 change agents were involved in the initiation stage. Nine of the 10 ICT change agents were engaged in a planning stage, while eight were part of an execution stage. Remarkably, only half of the ICT change agents participated in the close-out stage. Relating to this, the same number of ICT change agents did core work at the initiation, planning and execution stages. Only one did core work in the close-out stage.

The time period of project management stages varied greatly. "Initiation" and "Execution" took longer than the other two stages. Dependent on their formal job title, change agents played different roles in every project management stage.

Table 9: Change agents' roles within projects in Australian state agencies

| Interview data within CA-No | Change agent type | Formal job title | Innovation type | Pilot project | Involved in project stage | Core work at project stage | Role at core project stage | Core project stage time |
|---|---|---|---|---|---|---|---|---|
| CA1 | External | Manager | Incremental | No | Initiation, planning, execution | Planning | Planner, quality manager, risk manager | 6 months |
| CA2 | Internal | Manager | Incremental | No | Initiation, planning, execution | Planning | Analyst | 4 months |
| CA3 | External | Managing Director | Radical | Yes | Initiation, execution, close-out | Initiation | Diagnostician, relationship builder | 12 to 18 months |
| CA4 | Internal | Managing Lawyer | Radical | Yes | Initiation, planning, execution, close-out | Execution | Trainer | 2 years |
| CA5 | Internal | Project Manager | Radical | No | Initiation, planning | Initiation | Diagnostician, Designer of a business model | 2 ½ years |
| CA6 | Internal | Project Manager | Radical | Yes | Initiation, planning, execution, close-out | Execution | Planner of resources, knowledge promoter | 6 months |
| CA7 | Internal | Director | Incremental | No | Initiation, planning | Planning | Governor | 8 months |
| CA8 | Internal | Director | Incremental | Yes | Initiation, planning, execution, close-out | Initiation | Governor | 3 months |
| CA9 | Internal | Director | Radical | No | Initiation, planning, execution, close-out | Close-out | Sponsor | 6 months |
| CA10 | External | Director | Incremental | No | Initiation, planning, execution | Execution | Governor, team builder | 18 months |

Table 9 displays some ICT projects that commenced with a pilot. A pilot was more likely to be run because of radical innovation for two reasons. Firstly, change agents needed to "… start testing out the technology …" (CA6). Secondly, there was a demand to "… develop a proto-type system to test …" (CA3) whether the technical solution could be implemented in the potential organisational setting.

Different types of ICT change agents were engaged in such ICT projects. ICT change agents with the formal title "Director" were very often involved in ICT projects. One of the ICT change agents remembered that he needed to work with "… a Director of E-Government Networks, a Director of Strategic Projects, a Director of Architecture …" (CA1). A director commented on his role within an ICT project saying,

> … my role really is almost one of the governor … I don't worry about day-to-day. I have a project manager who actually runs the project …my role … is … just governing the activities and then communicating and reporting to our customers or our executives … (CA7)

Another director underlined that his role was "to make sure we went through proper government processes about how we engage external suppliers and later he added that also his "… function was to put in a bit of status into the meetings …" (CA8). Due to the fact that ICT projects were run on a temporary basis, there was a need to involve a higher organisational structure role such as director to provide the credibility for the project under government regulations. Depending on an ICT project, the director role

> … was as the sponsor … to meet the governance board and also to look at issues around resourcing of the project, resolving any major issues with regard to the vendors … and also to provide advice on stakeholder relations around the project in order that all the right people were involved in the project … (CA9)

The sponsor was accountable for the human resource management and cross-functional relationship building. However, regardless of the project management stage, the majority of directors performed the "Governor" role in an ICT project. Especially significant is that their roles were related to organisational structure and project

management. “Director” was a common organisational structure role that was predominant in the early stages of the project management.

In contrast to the director, whose role underlined the leadership within the organisational structure, the term “Project manager” was a generic title for the official who was accountable for the specific project. As a result, a project manager was involved in all project management stages. At every project management stage, a project manager performed a wide array of distinct project roles linked to project resource management, technology know-how and workflow design.

Further ICT change agents’ roles such as managers or managing lawyers were involved in technology projects. They provided expertise knowledge in the quality management, risk management, analysis and training. Therefore, their core roles within an ICT project were quality manager, risk manager, analysts and trainer.

The job titles of those ICT change agents were general terms within Australian state agencies that were sometimes specified through a particular extension. For instance, to the role of a director, the extension “Technology services” or “Business services” was attached, whereas to a project manager job title the extension “strategic projects” was added. The awarded extensions indicated the responsibility areas of the change agents.

The state agency project was expected to be executed over a particular period of time as outlined in the project plan. However, the actual duration varied. Project management stages were connected to each other through distinct timelines. In Australian state agencies, the initiation and execution project management stages took longer than planning and close-out. While at the initiation project management stage, the government guidelines and interests of various groups in a state agency needed to be fully considered and this required more time. At the execution stage, the documentation for clients was developed. A director (CA8) confirmed:

> What we now do for major projects, we engage the services of one of these people. These are professional writers. So, they work with the team. The team gives them the material and this person then translates into plain English for the clients …

At the execution stage, a technical contribution from technology units, vendors and detailed technical documentation was needed which also required a significant amount of time. One of the internal ICT change agents disclosed that whether the radical ICT innovation could be implemented or not, it was visible at the execution stage. By way of illustration, "… we had to change the primary systems build vendor … so there were a lot of problems towards the end of the project … … the whole project itself was a learning experience for everyone involved …" (CA9). The issues and learning experiences were not visible in the project documents.

Australian state agency project documents described the formal and planned processes within a project management framework which took place in organisational settings. Usually, the project documents were standardised and included a description of the set goals, stages, team members and documentation ICT innovation. The emphasis was on the adoption of standard processes, and ICT change agents needed to justify rigorously any deviations from the set standard. Some documents included detailed data about the way the project was structured, emphasising the successes of particular project management stages. The primary focus of project management change agents towards the adoption of new ideas was related to the audience within a defined project management framework. One ICT change agent commented, "…the audience was the project board … and the people in the project team …" (CA9). Moreover, the project documentation did not refer to distinct stakeholders' groups which were part of the adoption and diffusion process.

### *5.2.3. Change agents' roles within ICT diffusion*

As illustrated in Table 10, during the distinct project management stages different technology ideas were diffused. All ten change agents brought new technology ideas to

the projects. However, only four were adopted by the target audience. By comparison, of the three new ideas introduced by the team members, two were adopted. Of the ten ICT change agents, nine communicated with internal and external team members. It is clear from the table that all ICT change agents used formal and informal communication channels. Of the ten ICT change agents, eight also performed informal roles within an informal network.

Table 10: Change agents' roles within ICT diffusion in Australian state agencies

| Interview data within CA-No | Suggested a new idea | Adoption time of CA's new idea | Team member suggested a new idea | Adoption time of team member's new idea | Project communication | Formal communication channel | Informal communication channel | Role within informal network |
|---|---|---|---|---|---|---|---|---|
| CA1 | Yes | 9-12 months | Yes | Not adopted | Internal and external | Face-to-face, email, internal post, external post, phone, fax, interactive software | Face-to-face, email, phone, interactive software | Central connector |
| CA2 | Yes | Not adopted | No | Not applicable | Internal and external | Face-to-face, email, internal post, external post, phone | Face-to-face, email, phone, interactive software | Knowledge promoter |
| CA3 | Yes | Not adopted | Yes | 12 months | Internal | Face-to-face, email, phone | Face-to-face, email, phone | Bridge |
| CA4 | Yes | 3 days | No | Not applicable | Internal and external | Face-to-face, email, external post, phone, fax, using an other person as a messenger | Face-to-face, email, phone, using an other person as a messenger | Boundary spanner |
| CA5 | Yes | Not adopted | No | Not applicable | Internal and external | Face-to-face, email, internal post, external post, phone | Face-to-face, phone | Central connector |
| CA6 | Yes | Not adopted | No | Not applicable | Internal and external | Face-to-face, email, phone | Face-to-face, email | Central connector |
| CA7 | Yes | Not adopted | Yes | 1 months | Internal and external | Face-to-face, email, phone | Face-to-face | Knowledge promoter |

Table 10: (continued). Change agents' roles within ICT diffusion in Australian state agencies

| Interview data within CA-No | Suggested a new idea | Adoption time of CA's new idea | Team member suggested a new idea | Adoption time of team member's new idea | Project communication | Formal communication channel | Informal communication channel | Role within informal network |
|---|---|---|---|---|---|---|---|---|
| CA8 | Yes | 3 months | No | Not applicable | Internal and external | Face-to-face, email, internal post, external post, phone, interactive software | Face-to-face, phone | No |
| CA9 | Yes | 1 months | No | Not applicable | Internal and external | Face-to-face, email, external post, phone | Face-to-face, email | Gatekeeper |
| CA10 | Yes | Not adopted | No | Not applicable | Internal and external | Face-to-face, email, internal post, external post, phone | Face-to-face, email, phone | No |

Table 10 indicates that ICT change agents and a few team members spread new ideas within technological projects. It is apparent that most new suggestions were made in the early project management stages. Indeed, one of the participants confirmed that in an interview saying, "I think definitely at the first versus the last …" (CA9) stage. Whether a new idea was adopted or rejected, it depended on the person who made the suggestion and the group that needed to adopt it and the type of ICT innovation. More generally, one of the directors discussed his experiences within technology projects emphasising that "… a lot of the initial innovator ideas and stimulus for the project don't necessarily end up being adopted ..." (CA9). After the interview, he (CA9) remembered individuals, such as opinion leaders, who helped with the diffusion and adoption of ICT innovation. This change agent (CA9) underlined the significance of key informal leaders in the diffusion and adoption process.

In the process of ICT diffusion, ICT change agents relied on formal and informal paths. In some organisations, the formal communication was fixed; change agents were required to meet with their project members and customers in the specified time period. In the formal communication, all participants relied on standard channels such as face-to-face, email and phone. Nevertheless, the project process required change agents to send documents via post or fax. One change agent used a person as a messenger to deliver information to the higher level. This was a case when the change agent could not directly communicate with the person higher up the hierarchical structure.

In contrast, ICT change agents referred to face-to-face conversation as the main informal channel for informal communication. The nature of the informal discussion was "… quite spontaneous …" and that it occurred by chance, "… you know I will be walking around …" (CA7). In the same vein, another change agent who was experienced in working in public sector settings remembered "… thousands and thousands and thousands of conversations and coffee meetings and … corridor conversations …"(CA9) on an informal basis. Sometimes, informal communication occurred in order to collect evidence about issues that had arisen in the project. By way of illustration, "… the biggest crisis in the project was the failure of the system configuration vendor …" (CA9) which was firstly discussed in informal conversations. As enough evidence was gathered, the process "… becomes increasingly formalised …" (CA9). Another internal change agent stressed that the informal communication was necessary, "… sometimes … when you're trying to convey a point …" (CA7). Initially, the informal discussions aimed to prepare employees for adoption of ICT innovation in the subsequent formal meetings. For example, "…it builds that seed of this basic knowledge and then when you're getting in and you're having a formal discussion, everybody is thinking about this concept that you've informally discussed earlier ..." (CA7).

Informal communication occurred among internal and external employees. In time, some of the informal contacts led to the formation of an informal network. Internally,

change agents used an informal network to pace the diffusion of new ideas. In other words, "… you are not actually formally discussing and you let them think about that and then you let that person talk to other people about that as well …" (CA7). On the other hand, internal change agents maintained contact with professionals outside of the public sector "…to get their ongoing advice …." (CA8). One of the state agency's change agents, whose job was related to a managerial role, emphasised that this happened on an informal basis, saying, "… informal … we … spoke to the banks …" (CA8). These informal contacts were used "… to learn and achieve from experiences …." (CA8). Another internal change agent (CA7), who changed from the private to the public sector, revealed that he brought the informal networks from his previous organisations with him which he could use on demand.

To accelerate the diffusion of new technologies in the public sector settings, many private sector companies invited state agency change agents to their conferences. In the lunch break at the conference, networking among the ICT change agents was promoted. Hence, through these functions external change agents provided public sector change agents with the informal contacts in private sector settings.

The internal guidelines of Australian state agencies requested ICT change agents to communicate "… formal with …" (CA2) external companies and allowed "… informal communication … internally …" (CA2). One of the external change agents who worked for the public sector confirmed, "Again internally we did …" (CA1) communicate on an informal basis however, "… externally never …" (CA1) with vendors. However, at the beginning of the interview, he mentioned his "… good friends in the industry …" and later revealed how important the informal contacts were for accomplishing ICT project goals by stating "… if I had a strong relationship, I would use informal first … formal … after …" (CA1). ICT change agents were expected to be committed to state agencies' policies while being required to complete an ICT project. However, temporary technology projects driven by the rapid-changing ICT innovation also demanded the use of informal communication channels. The nature of innovative

projects induced the majority of the change agents to communicate on a formal and informal basis within and outside their state agencies.

### *5.2.4. Summary of case study 1*

This section summarises ICT change agents' activities within ICT projects in Australian state agencies. In the meantime, state agencies have transformed ICT reforms into community-level change through the identification of project management standards, which are framed primarily around the public sector requirements. These standards within technology projects assist state agencies to achieve their objectives and represent themselves in a positive manner. This kind of project management strategy is also reflected in project documents. In particular, state agencies' project documents illustrate that project management is a planned and formal process. That approach does not include any learning processes or any of the issues that have been raised during an ICT project.

Apart from the project management standards, state agencies adopt the best practice technology approaches from the private sector settings, for example, N-Tier application architecture. Usually, in pilot projects the ICT technology is customised to reconcile with the state agency environment. Often, external change agents who are temporarily engaged in state agency ICT projects encourage the public sector change agents to introduce new technologies into their organisations. Also, some of the private sector change agents become permanent employees of state agencies with the aim to implement new technologies in public sector settings using the technology experiences from their previous companies. However, in many cases, the public sector management of the target state agency requires an external practitioner recommendation before commencing with a new ICT project. An effect of this policy is that some change agents from state agencies visit banks and participate in lunch networking meetings to gain more insights, on an informal basis, into the best private sector technology practises.

These approaches reveal Australian state agencies as followers of private sector company projects when it comes to ICT innovation.

The transfer of best practice knowledge into state agencies on an informal basis and also the employment of private sector professionals within higher organisational structures enable Australian state agencies to complete ICT projects with predominately internal change agents. However, the internal and external change agents need to accomplish their work in accordance with organisational regulations such as government purchasing guidelines and set technology and project management standards which impact on project management stages and change agents activities. Therefore, the initiation and execution stages take longer than the other two stages.

In ICT projects, different types of change agents are involved, such as directors, project managers, managers and managing lawyers. A director performs a principal role of a "Governor" for several reasons. Firstly, ICT projects are initiated on a temporary basis and require a higher hierarchical structure role to provide the official recognition for the project. Secondly, in many ICT projects organisational processes are adjusted simultaneously and need to be in accordance with government guidelines. Therefore, the project manager urges an advocate at the higher hierarchical level to enforce the organisational change. Apart from a governor role, some directors portray themselves as sponsors, diagnosticians, team builders and relationship builders. However, their influence is more clearly evident in the early stages of the project.

On the other hand, a project manager is responsible for an ICT project. Consequently, a project manager is more involved in day-to-day activities such as diagnostician, designer of a business model, resource planner and knowledge promoter until an ICT project is completed.

Further formal roles involved within state agencies in ICT projects refer to the manager and managing lawyer. Both offer the specified knowledge required temporarily in

technology projects. Therefore, the role of a manager is reflected in an analyst, a quality manager and risk manager, whereas a managing lawyer acts as a trainer for the target professional audience. Those formal job titles of change agents are sometimes specified through a particular extension reflected in a unit or project name.

Apart from these formal roles, very often the internal and external change agents also play informal roles. These informal roles stem from informal contacts. Over time, the informal contacts in many cases precipitate the formation of an informal network. An informal network is free of hierarchical structure and can be formed at any time and any place. Change agents play significant informal network roles such as central connectors, knowledge promoters, bridges, boundary spanners and gatekeepers. These informal network roles serve multiple purposes. Change agents use internal informal networks to accelerate the diffusion of new technologies which need to be adopted by different stakeholders. By comparison, the external networks are used to gain new ICT knowledge quickly. The internal and external informal communications and networks are distinct processes which take place in Australian state agencies.

Depending on the formal and informal change agents' roles, organisational settings and ICT innovation, the time frame of diffusion and adoption processes all differ. It emerges that in every project management stage ICT diffusion occurs. However, many ICT innovations were not adopted by some stakeholders' groups even though a particular project management stage was completed. So, this indicates a mismatch between project management and diffusion. The standard project management framework measures the completion of particular tasks embedded in distinct stages without considering different adopters who will use the ICT technology within state agencies.

## 5.3. Case study 2

### *5.3.1. Setting the scene*

In setting the scene for the empirical analysis of ICT change agents' roles within 12 technology projects in three target German state agencies, project documents and my reflection paper were consulted. The interviews with participants show that some of the ICT change agents were engaged in more than one ICT project.

Increasing community demands drive German state agencies to simultaneously run various ICT projects. Nowadays, ICT innovation supports consolidated application infrastructure which aims to deliver higher-value online community services at lower cost. One of the change agents underlined that her ICT project was initiated for "... cost saving ..." (CA26) purposes. Due to cost saving issues, to date, many state agencies work on joint ICT projects. For example, within the State of Hessen different state agencies were involved in the HCN project. HCN stands for Hessen Corporate Network and it is evident that the name of this project is in the English language. Apart from the anglicising of corporate names, the German state agencies are naming some of their strategic significant projects in English. Also, ICT project documentation and change agents' interviews show a frequent use of English terminology, such as e-government, CIO, incident, management, change management and change agent and they are incorporated into the German language without further explanation. A frequent use of anglicised terms in German ICT and the growing number of technology projects influence German public sector settings. In the words of one of the state agency change agents,

> ... Government departments are not used to working with projects ... they are acquainted with the hierarchical nature of work that actually is not applicable to a project because a project has to use short communication paths … (CA21)

An implication of this statement is that the present state agency environment is ill-prepared for new ICT projects. By comparison with previous entrenched institutional structures, some German state agency ICT projects were perceived as virtual

enterprises. One of the ICT change agents discussed his project experiences, saying, "... at the bottom, we founded a small firm ..." adding that the project team "... made a project agreement and had developed individual activities …" (CA21) within state agencies. Looking back at that ICT project, he remarked that "… we were somehow pioneers …" (CA21).

In the meantime, new ICT projects are initiated within German state agencies. One of the ICT change agents referred to this new approach towards projects as "... a very strong political steering mechanism … this political guidance can change to a great extent within half a year ..." (CA18). In the same vein, one of the managers observed that ICT projects were based on "… politically motivated decisions ..." (CA24) driven by the Hessen State Government. Subsequently, the controlling mechanism of spending taxpayers' money takes place. One of the change agents underlined that the public sector is centred on "... government purchasing guidelines ..." (CA18). Therefore, in every ICT project those guidelines need to be considered.

This mechanism drives competition and project management standards. The competition was reflected in presenting awards to the best projects within a state agency. Winning projects applied high quality standards. The project management standards were a novelty within projects. By way of illustration, one of the change agents who completed an ICT project recently emphasised that "... particular standards did not exist at that time ..." (CA22). German state agency ICT change agents need to meet their obligations under the government purchasing guidelines and operate in accordance with project management standards.

### *5.3.2. Change agents' roles within project management*

Table 11 shows the ICT change agents' roles within ICT projects in German state agencies. Relating to this, the table illustrates that of the 12 projects, nine projects included radical ICT innovation. Also, nine ICT projects commenced with piloting. Of the 12 ICT change agents, seven were external and the rest internal. It is clear from the

table that the most frequently applied formal job title for a change agent was “Director”, while “Official in charge” was the least used. Four ICT change agents had the formal role of director, followed by project manager with three job titles and manager with two. Ten change agents were involved in the initiation and planning stages. Eleven of the 12 change agents were engaged in the execution stage whereas eight were part of the close-out stage. Four change agents did core work at the initiation, two at the planning and five at the execution stages. Only one did core work at the close-out stage.

The time period of the project management stages varied greatly. “Initiation” and “Execution” took longer than the other two stages. Depending on their formal job title, change agents played a variety of roles in every project management stage.

Table 11: Change agents’ roles within projects in German state agencies

| **Interview data within CA-No** | **Change agent type** | **Formal job title** | **Innovation type** | **Pilot project** | **Involved in project stage** | **Core work at project stage** | **Role at core project stage** | **Core project stage time** |
|---|---|---|---|---|---|---|---|---|
| CA18 | Internal | Director | Radical | Yes | Initiation | Initiation | Governor | 9 months |
| CA19 | External | Managing Director | Radical | Yes | Initiation, planning, execution, close-out | Planning | Knowledge promoter | 3 weeks |
| CA20 | External | Project Manager | Radical | Yes | Planning, execution | Execution | Planner, marketer, relationship builder | 13 months |
| CA21 | Internal | Managing Director | Radical | No | Initiation, planning, execution, close-out | Initiation | Governor, team builder | 6 months |
| CA22 | External | Director | Radical | Yes | Initiation, planning, execution, close-out | Execution | Software developer, marketer | 1 ½ years |
| CA23 | Internal | Manager | Radical | No | Planning, execution, close-out | Close-out | Marketer | 4 weeks |

Table 11: (continued). Change agents' roles within projects in German state agencies

| Interview data within CA-No | Change agent type | Formal job title | Innovation type | Pilot project | Involved in project stage | Core work at project stage | Role at core project stage | Core project stage time |
|---|---|---|---|---|---|---|---|---|
| CA24 | Internal | Manager | Radical | Yes | Initiation, execution, close-out | Initiation | Consultant | 3 years |
| CA25 | External | Project Manager | Radical | Yes | Initiation, planning, execution, close-out | Execution | Knowledge Promoter | 1 ½ years |
| CA26 | Internal | Official in charge | Radical | Yes | Initiation, planning, execution | Execution | Software developer | 1 ½ years |
| CA27 | External | Consultant | Incremental | No | Initiation, planning, execution, close-out | Execution | Software developer, Trainer | 7 weeks |
| CA28 | External | Software developer | Incremental | Yes | Initiation, planning, execution | Panning | Software developer | 4 months |
| CA29 | External | Project Manager | Incremental | Yes | Initiation, planning, execution, close-out | Initiation | Diagnostician | 6 weeks |

As depicted in Table 11, the majority of pilot projects were set out to pave the way for subsequent ICT projects. A project manager underlined that "... we gained technical experience ..." (CA20) in a particular technology within target organisational settings. He continued that "... we could not rely in every case on producer information or producer recommendations ..." (CA20).

Various types of ICT change agents participated in ICT projects. ICT change agents with the formal title “Director” participated predominantly in the early ICT project management stages. Especially significant is that a director performed the role of a “Governor” at the initiation stage. At the beginning of an ICT project, the “Governor” role provided the formal authority for a temporary ICT project. According to the organisational chart, “Director” was a common public sector organisational structure role.

In contrast to a director, whose role highlights the leadership within the organisational structure, the job title “Project manager” was applied to the official who was responsible for a specific ICT project. As a result, the majority of project managers were engaged in all project management stages. At every stage, a project manager performed various project roles related to the project management and ICT technology.

Further ICT change agent types, such as official in charge, consultant and programmer participated in an ICT project. They acted as experts in the field of software development. In addition, a consultant provided technological training inside and outside of the project team.

The titles of certain ICT change agents were very often specified through a particular extension. For instance, to the role of a director, the extension of a specific unit or department was attached, whereas to a project manager job title the name of an ICT project was added. The awarded extensions indicated the area of discipline of the change agents.

German state agency projects were planned to be executed over a particular period of time according to the standard project plans. Because of those set standards and assistance of external change agents some stages show identical time frames, for example, the execution stage (CA25; CA26). In German state agencies, the initiation and execution stages took longer than planning and close-out. At the initiation stage, the

government guidelines and different groups within state agencies needed to be contemplated and this required more time. At the execution stage, technical documentation and contribution from various technology departments and vendors was requested which took a significant amount of time.

Faced with the need to enhance the efficiency of public sector services, German state agencies implement a large number of radical ICT innovations. As a result, one of the change agents disclosed that "... the roles within project management were predominantly performed by external ..." (CA20) change agents. This was evidenced by the remarkable number of external change agents engaged in ICT projects. However, those external change agents "… are not familiar with structure..." and "... do not know actors ..." (CA20). Moreover, "… the approaches that have been successfully implemented in the private sector could not be transferred one to one into the public sector or state agency ..." (CA20). In other words, the internal ICT change agents were acquainted with organisational settings, whereas the external change agent had knowledge about innovation. Both needed to learn from each other. These distinct learning project experiences of change agents were not visible in the project documents.

German state agency project documents emphasised the formal guidelines within the projects. In many cases, the project documents featured standardised headings reflected in the description of set goals, project management stages, project team members and ICT technology. Some documents included detailed technical data. The focus was on the standard processes and change agents were in charge to follow set standard procedures.

However, distinct adopter groups reflected in stakeholders who needed to adopt the planned ICT innovation were not considered in formal project documents. According to formal documents, the diffusion and adoption processes were not a part of standardised ICT project management.

### *5.3.3. Change agents' roles within ICT diffusion*

As depicted in Table 12 below, during the distinct project management stages different ICT ideas were diffused. All 12 ICT change agents brought new suggestions to the projects. However, only eight change agents had their suggestions adopted by the target audience. By comparison, of the seven new ideas introduced by the team members, four were adopted. Of the 12 change agents, nine communicated both with internal and external team members. Only one change agent did not communicate on an informal basis and, therefore, did not play any roles within an informal network. Two change agents communicated on an informal basis but did not participate in an informal network. Also, two change agents were only members in an informal network without specific functions. Of the 12 change agents, seven performed informal roles within an informal network.

Table 12: Change agents' roles within ICT diffusion in German state agencies

| **Interview data within CA-No** | **Suggested a new idea** | **Adoption time of CA's new idea** | **Team member suggested a new idea** | **Adoption time of team member's new idea** | **Project communication** | **Formal communication channel** | **Informal communication channel** | **Role within informal network** |
|---|---|---|---|---|---|---|---|---|
| CA18 | Yes | Not adopted | Yes | Not adopted | Internal and external | Face-to-face, email, internal post, external post, phone | Face-to-face, using another person as a messenger | Central connector |
| CA19 | Yes | 8 months | Yes | Not adopted | Internal | Face-to-face, email, phone | Face-to-face, email, phone | Bridge |
| CA20 | Yes | Not adopted | Yes | Not adopted | Internal and external | Face-to-face, email, internal post, external post, phone, using another person as a messenger | Face-to-face, phone, using another person as a messenger | Gatekeeper |

Table 12: (continued). Change agents' roles within ICT diffusion in German state agencies

| Interview data within CA-No | Suggested a new idea | Adoption time of CA's new idea | Team member suggested a new idea | Adoption time of team member's new idea | Project communication | Formal communication channel | Informal communication channel | Role within informal network |
|---|---|---|---|---|---|---|---|---|
| CA21 | Yes | ¼ year | No | Not applicable | Internal and external | Face-to-face, email, internal post, external post, phone, fax | Face-to-face, email, phone | Boundary spanner |
| CA22 | Yes | 1 year | Yes | 3 – 6 months | Internal and external | Face-to-face, internal post, external post, phone, fax, using another person as a messenger | Face-to-face, email, internal post, external post, phone, fax | Gatekeeper |
| CA23 | Yes | 6 months | No | Not applicable | Internal and external | Face-to-face, email, internal post, external post, phone | Face-to-face, email, phone | No |
| CA24 | Yes | 1 year | Yes | 1 year | Internal and external | Face-to-face, email, internal post, phone, interactive software, using another person as a messenger | Face-to-face, email, phone | Central connector |
| CA25 | Yes | Very fast | Yes | 2 years | Internal | Face-to-face, email, internal post, external post, phone, fax | Face-to-face, email, phone | Member |
| CA26 | Yes | Not adopted | No | Not applicable | Internal and external | Face-to-face, email, internal post, external post, phone, interactive software, using another person as a messenger | Face-to-face, email, phone | Member |
| CA27 | Yes | Not adopted | Yes | 3 days | Internal and external | Face-to-face, email, phone | Face-to-face | Knowledge Promoter |
| CA28 | Yes | 1 year | No | Not applicable | Internal and external | Face-to-face, email, internal post, external post, phone | No | No |
| CA29 | Yes | 1 months | No | Not applicable | Internal | Face-to-face, email, internal post, external post, phone, using another person as a messenger | Face-to-face, email, phone | No |

As depicted in Table 12, as well as ICT change agents some team members also suggested new ICT ideas. To what extent those ideas were adopted depended on the person who made the suggestion, the target group and the type of ICT innovation. In some cases, ICT technologies were rejected regardless of whether they were proposed by a change agent or another team member. Nevertheless, the behaviour of each team member did not affect groups in the same way. Some individuals had a leading role in the diffusion process. So, when new suggestions came from those individuals, a large number of people quickly adopted the innovation. For example, one of the project managers had good contacts with opinion leaders who helped with ICT diffusion. In his (CA25) case, ICT innovation was adopted quickly. However, in most cases, the adoption of the ICT innovation followed a particular project management stage.

It is apparent that in the process of ICT diffusion and adoption, the majority of change agents used formal and informal communication channels. In some organisations, the process of formal communication was fixed; change agents were required to meet with their project members and clients in a specified time period. In the formal communication, all participants relied on standard channels such as face-to-face and phone. Nevertheless, the state agency process required change agents to send documents via post. A few change agents used a person as a messenger to deliver information to the higher organisational level - often in the same building. This was the case when the change agents could not directly or immediately communicate with the person higher up the hierarchical ladder.

On the other hand, change agents referred to face-to-face conversation as the main channel for informal communication. However, German state agency change agents view informal communication as the “Klein Dienstweg” (CA26) which means a short formal process. The nature of the informal conversation is “...spontaneous …” and “…depending on the situation ...” (CA21). In the same vein, another change agent who was experienced in working in public sector settings remembered that he operated “….. 90% …” (CA22) on an informal basis. The informal approach was practiced “...

because it was quicker ...” (CA22) and the ICT innovation was “... to some extent also developed experimentally ...” (CA22). A project manager added that a “... smoking corner ...” (CA25) is a good place for an informal communication.

Very often, informal communication allows for discussion of a variety of issues. By way of illustration, on an informal basis change agents “… discuss also controversial topics …” (CA9) but also prepare future adopters for the adoption process and “... give a person something that he/she does not get in the formal process …” (CA20). In the same vein, this external change agent underlined that the “…... margin of knowledge that I can share with others …” (CA20) is a basis for an informal network. Another external change agent who was a project consultant remembered that he provided free of charge “... technical support ...” (CA27) on an informal basis.

Informal communication occurred among internal and external change agents. In time, some of the informal contacts led to the formation of an informal network. One of the change agents confided that he needed “... two, three years” (CA18) to create an informal network. In the informal networks change agents performed roles of “Central connector”, “Bridge”, “Gatekeeper”, “Boundary spanner” and “Knowledge promoter”. A few change agents were members in an informal network without specific function. Internally, change agents used an informal network to accelerate the diffusion of new technologies. More generally, change agents maintained informal contacts with professionals outside of their organisations to obtain new ICT knowledge on demand. Despite the need for an informal process, the internal guidelines of German state agencies expected change agents to communicate in accordance with the “... organisational regulation ...” (CA26) which dictated the use of fixed communication channels. In addition to organisational rules, it emerged that the formalised process of ICT project management needed to be taken into account. For example, “... there are standard project procedures on how to run projects ...” (CA29).

### *5.3.4. Reflection*

After many years of ICT change agent work experiences within private sector companies, I was ready for a radical change and took a new job as a project manager in one of the German state agencies that offers various ICT services to other state agencies within the State of Hessen in Germany. Equipped with cutting edge technologies and knowledge in project management from private sector settings, I was bursting with confidence. However, after a few days, I realised that my know-how from the private sector was not sufficient enough to complete the project.

Based on the fact that I was using taxpayers' money, there was a control system in place which was reflected in the public sector purchasing guidelines. First of all, I had never worked for the public sector before and was not familiar with the regulations and the public sector language applied. Usually, the public sector guidelines were written by lawyers. Coming from an information technology and business background, I needed to find an interpreter who could explain to me how to apply the regulations to my ICT project. Furthermore, the government purchasing guidelines involved different units that needed to sign off the process paper before any services or products could be bought. This process took weeks.

Subsequently, I engaged various people from inside and outside of the organisation in the project. This project strategy triggered continuous discussions because many internal and external clients were not used to working within a project. Even though the project benefits were highlighted to them, only a few people adopted my technology approach. Due to this, I asked senior management for support. Unbeknown to me, an engagement of management placed the formal process to the height level. An effect of this was that a large number of employees requested me to explain the project impact on the organisational processes.

At the initiation stage, the implications of that ICT project were vague. So, I was not able to make any accurate predictions. Thus, a few opinion leaders diffused news across organisational boundaries that my technology approach was not well-considered. In public sector settings, a project that was not well-considered was associated with failure. As a result, more employees and clients came forward who refused to participate in the project. After that experience, I changed the project strategy, commencing the project with a pilot. Firstly, the pilot developed a prototype which was tested in the target organisational setting. Secondly, it provided an opportunity to learn from clients and employees' experiences within particular state agencies.

In the beginning of the pilot, I became aware that there were formal and informal leaders. Formal leaders approved the formal process, for example, budget and resources. On the other hand, opinion leaders influenced the diffusion and adoption processes. It emerged that the opinion leaders were laborious to track down because employees and clients avoided mentioning them. They usually talked about formal leaders. So, this gave an impression that the formal leadership was responsible for the whole innovation process.

During the pilot, I would run into people in the corridors every day. These spontaneous meetings triggered chats and fostered arrangements for a breakfast, lunch or dinner. In such informal conversations, I felt free to talk about my experiences. Consequently, some of these people opened up and talked about their experiences as well. Afterwards, they advised me who could help me with further information. In this way, I identified the opinion leaders who I invited to participate in the ICT project. Every opinion leader brought their informal networks into the project.

These informal networks served multiple purposes. Firstly, the informal contacts helped me to understand my role and other people's roles in the context of public sector settings. Secondly, on an informal basis, I gained more knowledge of insights and honest advice about which groups were more likely to adopt technology innovation.

Thirdly, the informal network prepared employees for the diffusion process before I approached them on a formal basis. At the beginning of the ICT project, my core informal role was knowledge promoter while at the end of the project, I performed the role of boundary spanner.

These informal conversations had an impact on people's behaviour. Through that approach I was able to trigger change in individual behaviour, build relationships inside and outside the state agency, exchange knowledge, motivate more people to participate in the project, plan tasks and human resources accurately in accordance with other state agencies. So, in time, many clients and employees became strong supporters of my project. Nevertheless, in such informal conversations, some people perceived me more as a human being than a project manager. Being viewed as a human being decreased my authority. Hence, many project team members and other employees felt free to criticise me whenever they were inclined. Furthermore, after every meeting with project team members; new information was diffused across organisational boundaries and more people spontaneously participated in debates and accelerated the diffusion of innovation. As a result, I did not need to carry out marketing for my project. However, many critical observers were convinced that my technology project was doomed to fail.

While my counterparts associated a lack of authority with project failure, I became aware that my approach exposed the hidden potentials of project team members. For instance, I allowed questioning of my project concepts and decisions in front of others. This gave some individuals the feeling of power that they did not possess before. This kind of new empowerment increased the creativity and performance of project team members in every project management stage.

During the project management stages, my change agent roles varied. At the initiation stage, my core roles referred to an initiator of change, knowledge promoter, team builder, relationship builder and a diagnostician of public sector settings. At the planning stage, I performed the main role of knowledge promoter and planner of

budget, resources and tasks, while at the execution stage my main roles were knowledge promoter and motivator. Terminator of the ICT project was the core role at the last project stage.

A mix of my formal and informal roles, support from clients and employees and pilot experiences ensured that the technology project was completed in accordance with the specified tasks, resources and timelines.

### *5.3.5. Summary of case study 2*

This section summarises ICT change agents' activities within ICT projects in German state agencies. State agencies use new ICT technologies to foster a fundamental shift in the focus, activities, and project outcomes. This fundamental shift in the focus is reflected in the frequent use of the English terminology and external change agents. English language is derived from the Anglo-Saxon environment which is framed around the German public sector requirements. This contemporary business approach discloses German state agencies as followers of Anglo-Saxon practices when it comes to technological innovation. This strategy requires an understanding of English terminology that is not entrenched in the German public sector environment. Relating to this, project documents do not show any of the ambivalence that may have arisen during the ICT projects. State agency project documents suggest that project management is a planned and formal process. In that process, the target groups, such as stakeholders, are informed about the benefits and are advised to adopt a new technology in order to modernise German public sector settings.

A large number of ICT projects aim to reduce costs and change organisational processes simultaneously. Nevertheless, those ICT projects need to consider the public sector regulations such as government purchasing guidelines. The majority of these projects introduce, manage and implement radical ICT innovations. Consequently, projects are

commenced with pilots. During the pilot stage, change agents develop a proto-type and learn from experiences about organisational settings.

The entrenched institutional structure induces German change agents to perform formal and informal roles in ICT projects. The formal roles of a change agent refer to organisational structure and project management. Change agents who operate at a higher hierarchical level, such as directors, support the project management team. Thus, a director's role is reflected in temporary project roles such as governor, knowledge promoter, team builder, software developer and marketer. Some of those director roles are performed more frequently, for example, a governor. A governor needs to provide the authority for the projects because technology projects are run on a temporary basis. Furthermore, through the redesigning of organisational processes parallel to introducing ICT innovation within projects, change agents require support at higher hierarchical levels. So, their influence is more clearly evident in the early stages of the project.

A project manager is responsible for an ICT project. Consequently, a project manager is more involved in day-to-day activities such as diagnostician, initiator of change, team builder, project planner, motivator, knowledge promoter, marketer, relationship builder and terminator until an ICT project is completed.

There are also other change agents involved in the German public sector ICT projects such as manager, consultant, software developer and official in charge. These professionals offer specified knowledge required in temporary technology projects. Therefore, the role of a manager refers to marketer as well as consultant, while a consultant performs the role of an adviser and trainer for the target professional audience. Software developer and official in charge design new applications. Many state agencies specify the aforementioned roles by adding a unit or function name to a job title.

Apart from these formal roles, often the internal and external change agents also play informal roles. These informal roles are relevant to the informal contacts. In time, the informal contacts in many cases lead to the formation of an informal network. This informal network can be formed at any time and any place. Change agents play significant informal network roles such as central connectors, knowledge promoters, bridges, boundary spanners and gatekeepers. These informal network roles serve multiple purposes. Firstly, change agents use internal informal networks to accelerate the diffusion of new technologies which need to be adopted by different stakeholder groups. Secondly, the external networks are used to gain new ICT knowledge quickly. However, change agents view those informal contacts and networks as a part of a short formal process, so-called “Klein Dienstweg”.

The time periods of diffusion and adoption differ depending on the formal and informal change agents’ roles, organisational settings and the type of ICT innovation. It emerges that in every project management stage, the diffusion of new ICT technologies occurs, spread by change agents and other team members. Many of those ICT innovations are rejected by certain groups. In some cases, opinion leaders help to accelerate the diffusion and adoption processes when asked by change agents. Without the support of opinion leaders, usually adoption processes take longer than the completion of a particular project management stage. More generally, the initiation and execution stages take longer than other project management stages in the German state agencies.

## 5.4. Summary of public sector case studies

This section outlines the main points that have been drawn from ICT change agents’ activities and ICT projects in Australian and German public sector settings. Public sector organisations apply new technologies to foster a fundamental shift in the focus, activities, and project outcomes. This is evident in a large number of projects initiated to introduce new technologies and simultaneously reduce costs by redesigning organisational processes. However, those ICT projects need to consider the public

sector regulations, such as government purchasing guidelines. Also, many of those projects manage and implement radical ICT innovations. Consequently, those projects are commenced with pilots. In the pilot process, change agents develop a proto-type and learn from experiences about technical and organisational settings.

In Australia and Germany, there is a frequent engagement of change agents in technology projects with the title “Director”, “Project Manager” and “Manager”. A director performs the principal role of “Governor”. A governor provides the credibility for a temporary ICT project and is an advocate at the higher hierarchical structure level due to fact that the organisational processes are adjusted in accordance with new technology in many projects at the same time. Apart from a governor role, some directors perform other roles such as sponsor, diagnostician, knowledge promoter, software developer, marketer, team builder and relationship builder. Their influence is more noticeable in the early stages of an ICT project. A project manager is directly accountable for an ICT project. Consequently, a project manager is more engaged in day-to-day activities. So, a project manager role builds on other roles such as diagnostician, designer of a business model, resource planner, motivator, team builder, relationship builder, knowledge promoter and terminator until an ICT project is completed. A manager offers the expertise which is required in particular project stages. Therefore, the role of a manager is reflected in an analyst, a quality manager, risk manager, marketer and consultant. The formal job titles of change agents, such as director, project manager and manager, are sometimes specified through a particular extension emphasising a specific unit or project name.

Some technology projects demand additional know-how in a specific field. In Australia, this is encompassed in the role of a managing lawyer who provides the training for a target professional group. In Germany, the training programme is executed by a consultant, whereas a programmer and official in charge bring to technology projects the necessary expertise in software development.

Apart from a great variety of those formal roles, very often the internal and external change agents in Australia and Germany also play informal roles. These informal roles are based on the informal contacts. Over time, the informal contacts in many cases lead to the formation of an informal network. An informal network is free of a hierarchical structure and can be formed at any time and any place. Change agents play significant informal network roles such as central connectors, knowledge promoters, bridges, boundary spanners and gatekeepers. These informal network roles serve multiple purposes. Firstly, change agents use internal informal networks to accelerate the diffusion of new technologies which need to be adopted by different stakeholders. Secondly, the external networks help to advance and exchange new ICT knowledge on demand. By comparison, for Australian change agents, those informal networks are distinct processes whereas for Germans they are a part of a short formal process so-called “Klein Dientsweg” which assists to achieve a set formal project goal.

In both countries, depending on the formal and informal change agents’ roles, organisational settings and ICT innovation, the time period of diffusion and adoption processes all vary. It emerges that in every project management stage the diffusion process of ICT occurs, spread by change agents and other team members. Many of those ICT innovations are rejected by certain groups. In some cases, opinion leaders help with diffusion and adoption. Usually, adoption processes take longer than the completion of particular project management stages. It is evident that in public sector organisations, the initiation and execution stages take longer than other project stages in response to the government guidelines, standardised project documentation and collaboration with different internal and external project groups.

In Australia and Germany, public sector organisations have transformed ICT reforms into community-level change through the identification of project management standards, which are framed primarily around the public sector requirements. These new routines assist to achieve set goals and represent state agencies in a positive manner. This kind of project management strategy is also reflected in project documents. In

particular, state agencies' project documents show that a project consists of the planned and formal process. That approach does not view any learning activities or any of the ambivalence that have been raised during an ICT project.

Apart from the standard project management methodology, public sector organisations apply the best practice technology approaches derived from private sector settings, for example, N-Tier application architecture and locking-in PC environment. Locking-in PC settings mean that ICT experts and users receive standard applications which they cannot change according to their business needs. These approaches reveal that the Australian and German public sectors are followers of private sector technology practices. In addition, German state agencies apply anglicised traits expressed in the English language which are brought in technology projects by the external private sector change agents. These private sector change agent practices will be discussed in the next chapter.

# 6. CHAPTER SIX: ANALYSIS OF PRIVATE SECTOR CASE STUDIES

## 6.1. Introduction

This chapter elaborates on the findings and analysis of two case studies within private sector settings in Australia and Germany. The case studies include three data sets: (i) extracted information from interviews, (ii) project documents and (iii) the final reflection paper related to my ICT change agent practices within private sector companies.

Table 13 displays keywords from the ICT change agents' transcripts and project documents within banks in Australia and Germany. Identified keywords were divided into main and supportive categories. As discussed in the previous chapter, main category keywords formed phrases related to components of the conceptual framework. As a result, these phrases created headings in the tables depicted for each case study and guided the process of analysis. Otherwise, the supportive category keywords underpinned the main keywords regarding the private sector settings.

Table 13: Keywords and phrases within ICT projects in private sector settings

| **Banks** | **Keywords from transcripts and documents** | **Phrases related to conceptual framework** |
|---|---|---|
| Australia, Germany | **Main keywords**<br>Change agent, formal, job, title, innovation, pilot, project, stage, core, work, role, time, new, idea, adoption, team, member, communication, channel, informal, network<br>**Supportive keywords**<br>Money, business, cash, economy, change, invest, market, aim, guidelines, structure, process, spontaneous, benefits, cost, reduction, consolidate, technology, replacement, architecture, external, internal, users, standard, method, platform, documentation, initiation, implementation, knowledge, vendor, manager, planning, relationship, influence, services, online, close-out, meetings | Interview data within CA-No, change agent's type, formal job title, innovation type, pilot project, involved in project stage, core work at project stage, role at core project stage, core project stage time, suggested a new idea, adoption time of change agent's new idea, team member suggested a new idea, adoption time of team member's new idea, project communication, formal communication channel, informal communication channel, role within informal network |

As noted in the previous chapter, this approach synchronised the case studies and identical headings were applied for the case study tables.

## 6.2. Case study 3

### *6.2.1. Setting the scene*

ICT change agents' interviews incorporated with project documents and my personal conversation notes within 12 technology project related to three Australian banks set the scene for the empirical analysis of change agents' activities. It emerged that some of the interviewed ICT change agents were engaged in more than one ICT project simultaneously.

Faced with the need to enhance both reliability and availability of bank services, the Australian government has released guidelines. One of the managers underlined that:

> … like most financial institutions we are highly governed by government guidelines about what we can or can't do and so we are consistently aware of what are corporate obligations … to the Australian government … (CA11)

Apart from meeting Australian government demands, there are also international standards that need to be considered. For example, one of the project consultants highlighted that his project was initiated to implement the "… international accounting standards …" (CA17) into an ICT system.

However, the majority of banks' projects aim to reduce costs. In order to save costs, some projects include joint work from other countries such as New Zealand and other Asian nations. For instance,

> … to consolidate all the businesses to one platform … to simplify the technology that supports those businesses, particularly, the credit card technology … it's primarily to allow, in particular, smaller countries to benefit from a rationality that we have developed for Australian business … and to reduce the overall operating costs by having one platform instead of many platforms … (CA16)

Another change agent also confirmed that his ICT project was initiated for "...cost-cutting ..." (CA12) purposes. Further change agent added to the cost debate that:

> … there is a stronger emphasis on budgets and schedules and I think we are much more conscious about our spending rates … (CA13)

Besides the cost factor, bank business owners assess technology projects according to a return on investment. A general manager argued that

> … we needed to demonstrate to the business owners that they would get a return … people have choices where they invest their project dollars and we actually had to convince the owners of that money that this project would get them a higher return than other projects (CA15)

In accordance with the business model, the banks' technology projects are commonly centred on effective financial management. In other words, Australian ICT projects intend to increase profits. Simultaneously, they need to consider particular national and international regulations. These requirements affect change agents' activities within project management.

### *6.2.2. Change agents' roles within project management*

Table 14 illustrates the ICT change agents' activities within technology projects in Australian banks. Relating to this, the table shows that of the seven change agents interviewed only two were external and the rest internal. It emerged from the table that the most applied formal job title for a change agent was "Manager", while "Chief" was the least used. Six had the formal role of manager, followed by chief with one job title. Change agents with the formal job title "Manager" performed various project activities and were involved in different project stages. Four of the seven change agents were engaged in an initiation and planning stage, while five were part of an execution and close-out stage. Relating to this, one did core work at the initiation, three at the planning, one at the execution and two at the close-out stages.

Project management stages had distinct timelines. “Initiation” and “Planning” took longer than the other two stages. Six of the seven projects introduced incremental ICT innovation and five commenced without piloting.

Table 14: Change agents’ roles within projects in Australian banks

| Interview data within CA-No | Change agent type | Formal job title | Innovation type | Pilot project | Involved in project stage | Core work at project stage | Role at core project stage | Core project stage time |
|---|---|---|---|---|---|---|---|---|
| CA11 | Internal | Manager | Incremental | Yes | Execution, close-out | Close-out | Knowledge promoter | 3 months |
| CA12 | Internal | Manager | Incremental | No | Close-out | Close-out | Tester | 7 months |
| CA13 | Internal | Manager | Incremental | No | Planning, execution, close-out | Planning | Planner | 4 months |
| CA14 | External | Manager | Incremental | No | Initiation, planning, execution, close-out | Execution | Implementer | 2 days |
| CA15 | Internal | General manager, project manager | Incremental | No | Initiation, planning, execution, close-out | Planning | Strategic planer, project manager | 12 months |
| CA16 | Internal | Chief | Incremental | No | Initiation | Initiation | Strategic planner | 12 months |
| CA17 | External | Manager | Radical | Yes | Initiation, planning, execution | Planning | Adviser | 2 months |

Table 14 shows some ICT projects which started with a pilot. A pilot was initiated because “… early life-cycle testing is really very important” (CA11). Before

commencing with an ICT project, change agents evaluated whether the technology could be implemented in the target organisational setting.

In subsequent projects, different types of change agents were involved. Change agents with the job title “Manager” dominated technology projects, whereas “Chief” was predominately engaged at the initiation stage. “Manager” was a broad term that embraced various roles such as knowledge promoter, planner, consultant, tester and implementer. In technology projects with strategic relevance (see CA15), sometimes general managers acted as strategic planners and project managers at the same time. To ensure the strategic direction of a company, general managers and project managers were supported by chiefs. A chief role was related to the strategic planning. Both general manager and chief roles were embedded in the vertical hierarchy and aimed to provide the credibility for a temporary ICT project.

Change agents’ job titles were general terms within organisational and project management structures. Sometimes they were embellished through a particular extension. For instance, before a manager job title, the extension “solution” or “technical delivery” was inserted, whereas to the role of a chief, the extension “of technology” was added. The awarded extensions specified the responsibility areas of the change agents.

The Australian bank projects were planned according to project timelines. However, the actual duration varied. In Australian banks, the initiation and planning project management stages took longer than execution and close-out. At the initiation stage, different technology projects competed for budgets and resources. So, it took time until decision-makers approved or rejected a project plan. Moreover, banks’ projects were run on a large scale, engaging various units and often many external companies in different countries. Consequently, this was visible at the planning stage. One of the German change agents who worked in both Australian and German technology projects confirmed that by saying, “... we needed to wait very long until Australians told us what

they wanted …" (CA17) to be implemented at the execution stage. After needs were articulated, it was a quick implementation procedure. He (CA17) acknowledged that by revealing, "... we had discussed the items and afterwards implemented" in Australia. An effect of this is that the execution and close-out stages are shorter than other project management stages within Australian banks. By comparison in Germany, he stressed that at the execution stage "... needs to be much more documented ..." (CA17). Similarly, in Australia and Germany, he (CA17) observed that the project "… method is the same …".

Project documents reflected the standard project method. This standard method consisted of standard templates that were used in various projects, for example, standard testing procedures. The primary focus of that standard project management was related to the budget, resources, timelines and ICT technology. However, the standard approach excluded distinct groups that needed to adopt the new ICT technology in the diffusion process.

### *6.2.3. Change agents' roles within ICT diffusion*

Table 15 presents the diffusion process in distinct project management stages. In every project management stage various new ideas were diffused. All seven change agents brought new technology ideas to the projects. However, only five were adopted by the target audience. By comparison, of the five new ideas introduced by the team members, three were adopted. Of the seven change agents, six communicated with internal and external team members. It is evident from the table that all change agents applied formal and informal communication channels. Also, all change agents performed informal roles within an informal network.

Table 15: Change agents' roles within ICT diffusion in Australian banks

| Interview data within CA-No | Suggested a new idea | Adoption time of CA's new idea | Team member suggested a new idea | Adoption time of team member's new idea | Project communication | Formal communication channel | Informal communication channel | Role within informal network |
|---|---|---|---|---|---|---|---|---|
| CA11 | Yes | Not adopted | No | Not applicable | Internal | Face-to-face, email, interactive software | Face-to-face, email | Facilitator |
| CA12 | Yes | Not adopted | No | Not applicable | Internal and external | Face-to-face, email, phone | Face-to-face, phone | Influencer |
| CA13 | Yes | 6 weeks | Yes | 3 months | Internal and external | Face-to-face, email, phone | Face-to-face, email, phone | Knowledge promoter |
| CA14 | Yes | Quite immediate | Yes | 1 month | Internal and external | Face-to-face, email, phone | Face-to-face | Knowledge promoter |
| CA15 | Yes | 5 months | Yes | Not adopted | Internal and external | Face-to-face, email, phone, using another person as a messenger | Face-to-face, email, phone, using another person as a messenger | Influencer |
| CA16 | Yes | 5 months | Yes | 5 months | Internal and external | Face-to-face, email, phone, video conferencing | Face-to-face, phone | Influencer |
| CA17 | Yes | Quite immediate | Yes | Not adopted | Internal and external | Face-to-face, email, phone | Face-to-face, phone | Knowledge promoter |

Table 15 shows that change agents and a few team members spread new ideas within ICT projects. One of the change agents commented that whether a new suggestion was adopted "… depends on who the stakeholders are …" (CA16). Moreover, it depended on the type of innovation. One of the managers explained that apart from the diffusion of ICT innovations, he suggested to change "… the process of how to do things …" (CA12) more efficiently. His (CA12) idea was rejected. In cases CA14 and CA17, innovations were adopted quickly. External change agents revealed, "… a message that we wanted to get out. It was obviously more powerful to come from that person …" (CA14). In the same vein, an internal change agent (CA12) confirmed that some people are more powerful in the diffusion process than others.

He (CA12) revealed how he influenced adopters in other companies towards innovation:

> What I do, if I want someone to do something and they are not doing it, if I know another person can influence to do something, I enrol them into that activity … I use them to help to influence the person to do that activity that I want.

In other words, it was a complex process and it took time to find opinion leaders who could help to influence others relating to a particular innovation. Due to the fact that he (CA12) was new in the current company and needed time to find informal leaders, his suggestions were still in the adoption process. Another change agent also needed assistance from key individuals by "... modelling of processes and then illustrating how to implement these requirements into the system ..." (CA17). These examples demonstrate that many change agents engage opinion leaders to accelerate the diffusion and adoption processes.

It is evident that within these processes, change agents used formal and informal communication channels. In some companies, the formal communication channels were fixed; a change agent was advised to meet with project members and clients in a defined time period and to write "… a status report …" (CA14) related to the progress of an ICT project. In the formal communication, all participants relied on standard channels such as face-to-face and email. One change agent used a person as a messenger to deliver messages to the higher organisational level. This was the case when the change agents needed to communicate directly and immediately with individuals higher up the hierarchical ladder.

In contrast, change agents referred to face-to-face conversation as the main channel for informal communication. In informal conversations, one change agent tried to "… influence people …" (CA12) towards the adoption of new ICT technologies and this behaviour referred to the role of influencer. Sometimes many ICT projects were launched simultaneously and they competed for the same human resources. So, some

change agents tried on an informal basis "… to put projects forward, to make deadlines and timelines" (CA11). This kind of behaviour was embedded in the role of facilitator. In contrast, the chats with the members of external networks were used "… to help someone out or help me out … seeking or providing advice …" (CA13). This approach encompassed the role of knowledge promoter. For what purposes the change agents applied the informal networks were reflected in their informal roles such as influencer, facilitator and knowledge promoter.

### *6.2.4. Summary of case study 3*

This section summarises ICT change agents' activities within technology projects in Australian banks. Australian banks transform clients' demands and government guidelines into organisational level change through the initiation of ICT projects. These projects assist banks to achieve their set goals towards profits by adjusting organisational processes in accordance with new technologies at the same time. However, this approach is not visible in project documents. Project documents reflected that project management includes a standard technology process. This standard process excludes the individual learning strategies of team members.

In addition to the project management standards, the internal and external change agents need to accomplish their work in accordance with set technology standards and national and international regulations. These external pressures induce Australian banks to work on joint projects with other banks overseas. Joint projects consolidate ICT technology to one platform and reduce costs. In this process, banks rely predominately on internal change agents.

Subsequently, different types of change agents participate in technology projects such as chiefs and managers. Especially significant is that their roles are related to organisational structure and project management. Chiefs' roles are visible in the organisational charts at the higher hierarchical structure level. Their aim is to promote

the strategic decisions via ICT projects. In contrast, managers perform principal roles in distinct project stages encompassed in knowledge promoters, testers, implementers, planners and consultants. In strategic relevant technology projects, general managers act as project managers at the same. Both chiefs and general managers provide the credibility for a temporary ICT project.

Aside from the formal project roles, the internal and external change agents also perform informal roles. These informal roles are based on informal contacts. Over time, the informal contacts form informal internal and external networks. Within informal networks, change agents play roles such as facilitators, influencers and knowledge promoters. Change agents contact internal and external informal networks for different reasons. Internal informal networks are used for diffusion and adoption purposes, whereas external informal networks allow for a quick exchange of ICT know-how. These internal and external informal communications and networks are distinct processes.

Depending on the change agents' behaviour, organisational settings and the type of ICT innovation, the timelines of diffusion and adoption processes vary. When a new idea was suggested by an opinion leader, ICT innovation was adopted quickly. It is evident that in every project management stage ICT diffusion occurs. However, many ICT innovations are still in the adoption process with some stakeholder groups even though a particular project management stage is terminated. Due to an increasing number of set standards, competition for project budgets and interaction with global counterparts in technology projects, the initiation and planning stages take longer than the other stages within Australian bank project management. The standard project management framework measures the completion of particular tasks with specified budgets and timelines, excluding the potential adopters who need to work with new ICT technologies across extended bank boundaries.

## 6.3. Case study 4

### *6.3.1. Setting the scene*

ICT change agents' interviews together with project documents and my reflection paper within 12 technology projects set the scene for the empirical analysis of change agents' activities. Some of the interviewed ICT change agents work on more than one technology project simultaneously.

In the German bank projects, there is a strong emphasis on spending rates. In the words of one of the change agents: "We always have to compete for the budget" (CA31). Due to a strong emphasis on money, some projects were relinquished because the bank discovered a new solution which was regarded to be more profitable. As a result, one of the large projects "... was terminated within a few hours" (CA30). After that decision, all of the project work and experiences were labelled as insufficient for the bank. So, the bank shifted its focus to the new activated units which aimed to boost profits.

Further to profits, banks adjust organisational processes within ICT projects. A change agent observed that banks "... place a greater focus on processes ..." (CA35). In many cases, bank units needed to design new processes. Designing new processes and implementing new technologies at the same time impacted on a project. In the words of an external change agent, "... from my point of view, the project failed partially because the internal units were primarily occupied with themselves …" (CA40).

Apart from the process of reengineering, bank units are concerned with the upgrades of an older architecture. One of the project managers said that the aim of her project "… was actually to replace the prevailing client-server application through a web-based solution" (CA32). Another change agent confirmed that his project was initiated because of "the replacement of old systems ..." (CA31). An implementation manager explained that "... an application was implemented on a new operating system" (CA36) in his project.

Ongoing updates aim to reduce costs. A consultant emphasised that his technology project was initiated for "... cost saving ..." (CA33) purposes. Due to cost saving issues, currently, many banks set on the internet technology. One of the change agents (CA38) revealed that banks need to implement innovation across extended organisational boundaries. His project aimed "to consolidate 68 branches worldwide to one internet platform" (CA38).

Usually, bank technology projects are run on a global scale. To find a common ground with other branches, many German banks name their projects in the English language. For example, one of the project names was "Cash Pooling System" (CA31). Also, project documents and change agents' interviews demonstrate a frequent use of English terminology, such as cash, business case, deals, review, change, management, change agent, roll-out, software, consultant, implementation manager, CEO and private banking; they are incorporated into the German language without further explanation.

German banks are part of a world market. So, German banking is "... highly driven by economic trends within the bank community ..." (CA31). Consequently, "... nowadays, the banks continually consider merging with each other ..." (CA31). These global trends affect change agents' activities within projects.

### *6.3.2. Change agents' roles within project management*

Table 16 shows the ICT change agents' activities within ICT projects in German banks. Relating to this, the table illustrates that of the 12 change agents only five were internal and the rest external. It emerged from the table that the formal job titles "CEO", "Manager", "Consultant" and "Project manager" were frequently applied for change agents, while "Reviser" and "Developer" were the least used. Three had the formal role of CEO, manager and consultant, while two CEOs at the same time performed the role of a project manager followed by revisor and developer with one job title.

Four of the 12 change agents were engaged in all four project stages, whereas one was involved in three stages, six in two and one in one stage. Relating to this, three did core work at the initiation, two at the planning, five at the execution and two at the close-out stages.

Some of stages presented the same time frames. “Initiation” and “Execution” took longer than the other two stages. Eleven of the 12 projects introduced incremental ICT technologies, whereas remarkably only one featured a radical innovation. Seven projects commenced with piloting.

Table 16: Change agents’ roles within projects in German banks

| **Interview data within CA-No** | **Change agent type** | **Formal job title** | **Innovation type** | **Pilot project** | **Involved in project stage** | **Core work at project stage** | **Role at core project stage** | **Core project stage time** |
|---|---|---|---|---|---|---|---|---|
| CA30 | Internal | Manager | Radical | No | Execution, close-out | Close-out | Coordinator, Tester | ¾ year |
| CA31 | Internal | Reviser | Incremental | Yes | Initiation, planning, execution, close-out | Close-out | Reviewer | 6 months |
| CA32 | External | Project manager | Incremental | No | Execution, close-out | Execution | Coordinator, provider of a record | 6 months |
| CA33 | External | Consultant | Incremental | Yes | Execution, close-out | Execution | Adviser, provider of a record | 6 months |
| CA34 | External | CEO, project manager | Incremental | No | Initiation, planning, execution, close-out | Planning | Strategic planer | 6 – 8 weeks |

Table 16: (continued). Change agents' roles within projects in German banks

| Interview data within CA-No | Change agent type | Formal job title | Innovation type | Pilot project | Involved in project stage | Core work at project stage | Role at core project stage | Core project stage time |
|---|---|---|---|---|---|---|---|---|
| CA35 | External | CEO, project manager | Incremental | Yes | Initiation, planning, execution, close-out | Planning | Strategic planer | 4 – 6 weeks |
| CA36 | Internal | Manager | Incremental | Yes | Execution, close-out | Execution | Implementer | 6 months |
| CA37 | External | CEO | Incremental | Yes | Initiation, planning, execution, close-out | Initiation | Technology architect | 6 months |
| CA38 | Internal | Manager | Incremental | Yes | Execution, close-out | Execution | Provider of a record | 3 – 4 months |
| CA39 | Internal | Software developer | Incremental | No | Initiation, execution, close-out | Initiation | Knowledge promoter | 12 months |
| CA40 | External | Consultant | Incremental | No | Initiation | Initiation | Analyst | 4 months |
| CA41 | External | Consultant | Incremental | Yes | Execution, close-out | Execution | Software developer | 9 months |

Table 16 illustrates that the majority of ICT projects were launched with a pilot for various reasons. Firstly, the organisational "... processes were not designed ..." so, the change agents needed to "... define the process ..." (CA31) before being able to implement and test new technologies. Secondly, a pilot was initiated because a "... new version included a lot of new features …" (CA36) which required intensive testing. Thirdly, change agents evaluated whether innovation could be carried out in the target organisational setting with the planned "… project budget …" (CA35).

Particularly, change agents with the formal job title “CEO”, “Project manager”, “Manager”, “Consultant”, “Developer” and “Reviser” participated in subsequent projects. Beyond the job title “CEO” distinct project roles such as strategic planner, project manager and technology architect were concealed. Their knowledge was required in all project stages. In response to the vertical client structure in which a technology project was embedded, sometimes clients requested an external CEO to take responsibility for the whole project and act as project manager. As a result, a change agent (CA32) with the job title “Project manager” was foremost accountable for a project at the execution stage. At that stage, a project manager performed the role of a coordinator and provided a project record. “Manager” was a broad term that ranged from various roles such as coordinator, tester, implementer to provider of a record. A consultant role enclosed project roles such as analyst, programmer, adviser and provider of a record. While a developer promoted technology knowledge within a project, reviser provided a project record.

Due to the fact that change agents’ job titles were general terms, sometimes they were surrounded by a particular extension. For example, before a manager job title, the extension “implementation” was inserted. This extension defined the function of a change agent.

Bank projects were under an obligation to be executed at a certain time according to the standard project management framework. Because of set standards and great participation of external change agents, some time lines showed the same time periods. Particularly, it is evident that the external change agents (CA34; CA35) transformed their project experiences at the planning stage which helped to shorten the planning time frame. In German banks, the initiation and execution project management stages took longer than planning and close-out. At the initiation stage, different technology projects competed for budgets and needed to consider guidelines and engage some employees from different branches worldwide. At the execution stage, German change agents paid

a lot of attention to the "… quality management …" (CA35) guidelines and documentation. A project manager explained that in her project, the execution stage took longer because the team "... developed a comprehensive description of the business tests ...." (CA32). Consequently, intensive project documentation demanded more time.

Extensive project documentation reflected that the quality management standards were followed in various projects. A change agent in the role of reviser controlled whether those standards were applied. The main focus was on product quality and processes. An effect of this was that the majority of employees who needed to adopt ICT innovation in the diffusion process were excluded.

### *6.3.3. Change agents' roles within ICT diffusion*

Table 17 illustrates the diffusion process within project management. New ideas were diffused in every project management stage. All 12 ICT change agents suggested new ICT ideas within projects. Of the 12 suggested new ideas, ten were adopted by the target audience. By comparison, of the seven new ideas introduced by the team members, three were adopted. Ten change agents communicated with internal and external team members. It is evident from the table that all change agents applied formal communication channels. Ten change agents communicated on an informal basis whereby on top of it seven performed informal roles within an informal network.

Table 17: Change agents' roles within ICT diffusion in German banks

| Interview data within CA-No | Suggested a new idea | Adoption time of CA's new idea | Team member suggested a new idea | Adoption time of team member's new idea | Project communication | Formal communication channel | Informal communication channel | Role within informal network |
|---|---|---|---|---|---|---|---|---|
| CA30 | Yes | 14 – 21 days | Yes | 1 – 2 months | Internal and external | Face-to-face, email, phone, interactive software | Face-to-face, email, phone | Knowledge promoter |
| CA31 | Yes | 14 days | Yes | Not adopted | Internal and external | Face-to-face, email, phone, interactive software | Face-to-face | Influencer |
| CA32 | Yes | Not adopted | No | Not applicable | Internal and external | Face-to-face, email, external post, phone | Face-to-face, phone | No |
| CA33 | Yes | 3 – 6 weeks | Yes | 6 weeks | Internal and external | Face-to-face, email, internal post, phone, fax, interactive software | Face-to-face, email, phone | Influencer |
| CA34 | Yes | 3 weeks | No | Not applicable | Internal and external | Face-to-face, email, phone | Face-to-face, email, phone | Knowledge promoter |
| CA35 | Yes | 6 months | Yes | Not adopted | Internal and external | Face-to-face, email, phone, fax | Face-to-face, phone | No |
| CA36 | Yes | Fast | No | Not applicable | Internal and external | Email, internal post, phone | No | No |
| CA37 | Yes | 3 – 4 months | Yes | 3 – 4 months | Internal and external | Face-to-face, email, phone | Face-to-face, email, phone | Influencer |
| CA38 | Yes | 3 – 6 months | Yes | Not adopted | Internal | Face-to-face, email, phone, interactive software | Face-to-face, email, phone | No |
| CA39 | Yes | Not adopted | No | Not applicable | Internal and external | Face-to-face, email, phone, fax | Face-to-face, email, phone | Knowledge promoter |
| CA40 | Yes | 2 – 3 months | No | Not applicable | Internal and external | Face-to-face, email, phone | No | No |
| CA41 | Yes | Fast | Yes | Some 1 – 3 weeks/ others rejected it | Internal | Face-to-face, email, phone, interactive software | Face-to-face, email, phone, interactive software | Knowledge promoter |

Table 17 shows that ICT change agents and a few team members diffused new ideas within technology projects. Some of those suggestions were adopted faster than others. The adoption process was dependent on the target person, for example, one change agent (CA36) "... had a short discussion with [his] team leader" who was fast in adopting the design of a new operating system. In the case of one change agent (CA41), he proposed a new solution relating to an "… application server …" to his project manager who adopted it. Similar in both examples, change agents suggested improvements to existing systems to the formal leaders who already expected them to deliver the novelty. This approach is not representative to all other adopters. Some groups requested to test an innovation before adopting or rejecting it. By way of illustration, "... a suggestion was tested and then it was a case of days ..." until it was adopted or "… sometimes it was rejected ..." (CA41).

Often project managers were eager to meet demands of formal leaders in the first place. In such projects, "... the pace was very fast ..." (CA41). So, there was no time to consider "... specific requests of users ..." (CA41) or opinion leaders. Consequently, "... there was a certain tension ..." resulting in some adopter groups rejecting innovation even though that project was completed in the specified time period. Another change agent reported that in her project the diffusion and adoption process "... is not completed" (CA32).

In the process of ICT diffusion, change agents used formal and informal channels. In some companies, the process of formal communication needed to be placed on record. A project manager highlighted that in her project "... the whole team tried to establish by documentary evidence ..." (CA32). Also, in other companies, the process of project documentation was fixed. Change agents were asked to see their project members and clients on a regular basis. A manager explained that he needed to participate in the "... regular status quo meetings ..." (CA38). In the formal communication, the majority of participants relied on standard channels such as face-to-face, email and phone. In certain situations, the formal process required change agents to send project documents via post

or fax. Some change agents used interactive software to exchange technology news among team members.

In contrast, the majority of change agents communicated face-to-face in informal conversations. Because German banks operate in the global environment diverse groups from different branches worldwide were involved. So, change agents needed to assess the situation in advance. An external change agent revealed that “It means that I needed to understand whether my actions could lead to a political implication …” (CA37). In certain circumstances, the informal communication occurred in a “... stress situation ...” or “…deadlock …” (CA32) in order to understand an issue. Once the issue was discussed on an informal basis first, the process became increasingly formalised again. Another change agent underlined that informal contacts helped to “... create marketing for the project” (CA31). In the same vein, a CEO used “... contacts in the bank to boost spirits ...” towards innovation (CA34).

Some change agents avoided informal communications arguing that “... German [culture] is formal ...” (CA35) and otherwise did not regard informal conversations as a professional way of managing projects. At particular project management stages, a few change agents (CA36; CA40) had clear defined technical tasks and did not require informal communications. Others needed to communicate on an informal basis, for instance, when they were under pressure, however, they did not participate in informal networks. Over time, many informal contacts led to the formation of an informal network. One of the change agents confided that he “... had [his] network previously ...” and “... this had been passed on ...” (CA31). In the informal networks change agents performed roles of “Knowledge promoters” and “Influencers”. Internally, change agents used an informal network to accelerate the diffusion of innovation. More generally, change agents maintained informal contacts with professionals outside of their banks for an “... exchange of experiences ...” (CA31) about new ICT technologies. Despite the need for an informal process, the internal project guidelines of German banks required change agents to communicate on a formal basis.

### *6.3.4. Reflection*

I entered my first job as a change agent in CompuNet in the role of a software trainer and consultant predominately for the banking industry in Frankfurt, Germany. The founder of CompuNet was Jost Stollmann, a graduate from the Harvard Business School. He brought from the USA experiences of organisational change and an entrepreneurial spirit which were reflected in the company's strategy. CompuNet aimed to foster entrepreneurs in order to revitalise this technology firm on an ongoing basis. So, every employee was empowered to make his or her own decisions about the best approaches for clients and to take risks in that innovative process. As a result, the majority of CompuNet employees spent more time with clients than with their colleagues. This strategy expanded employees' ICT knowledge of business within particular organisational settings.

The new CompuNet strategy was perceived as an Americanisation of the German environment and triggered controversial discussions. Some German companies claimed that this kind of extremely flat hierarchical structure contradicted the formal vertical hierarchical clients' structures, which presented clearly defined formal roles, and predicted bankruptcy of the firm. Others embraced this new approach as a liberalisation of employees and clients. Indeed, both employees and clients had gained power that they did not possess before. CompuNet employees acted as change agents in the sense that they were allowed to alter any clients' organisational or technological processes without consultation with their supervisors. On the other hand, clients were advised to substitute a change agent if they were not satisfied with the performance.

An implication of that approach was that the employees who were rejected by clients lost their jobs quickly or they resigned for different reasons. Some accepted the job offers from their clients, others were thrilled with an entrepreneurial life with the result that they founded start-up firms. The new entrepreneurial life required up-to-date knowledge of new ICT technologies, business and social skills within different

organisational settings. So, every day involved learning-by-doing and high uncertainty. To be able to cope with the uncertainty better, the majority of employees formed internal and external networks which provided free of charge learning from experience knowledge on demand. At the beginning, my role within such a network was an influencer and knowledge promoter.

Subsequently, the informal networks helped me to exchange and apply experiences in everyday activities and enriched my formal roles. Moreover, I built relationships with opinion leaders who introduced my consulting and training programmes to their counterparts which diffused new ideas across organisational boundaries.

In the role of software consultant, I participated at varying project stages. At the initiation stage, I was an initiator of change by introducing new applications. At the planning stage, I advised a project team on various issues relating to the new features in particular applications followed by preparation for training programmes at the execution stage. At the close-out stage, my role as a consultant terminated and I could change to the role of a trainer.

As a trainer, I was usually involved in the close-out stage. At that point, clients were advised about new applications on their computers and my role was to train various groups face-to-face in how to use the software efficiently. Some clients requested standard courses and others customised ones. Standard courses were more for employees who had moderate experiences within applications, whereas advanced users were trained in workshops. Despite differences in requirements, every employee was trained on a computer with the software that best suited his or her needs. As a result, before every session, computers were installed automatically with different software applications.

The behaviour towards adoption of new technologies varied. Some employees adopted new ideas in a training session quickly and were able afterwards to use the software on

their computers in the office. Often, these were employees who were already familiar with the software. Others took over basic ideas in the training programmes but could not apply those in their organisational settings and needed help from a hotline. Usually, users preferred to talk to their colleagues or called me before contacting the hotline. This approach helped to modify the training material for the next training session.

### *6.3.5. Summary of case study 4*

This section summarises ICT change agents' activities within technology projects in German banks. Banks use new ICT technologies to foster global businesses. This shift towards globalisation is reflected in the frequent use of English terminology and external change agents. English language is derived from Anglo-Saxon settings which are framed around the German private sector requirements. This global business strategy reveals German banks as followers of Anglo-Saxon practices when it comes to technological innovation. This approach requires a new understanding of English terminology that is not explicitly stated in the German private sector environment. Project documentation rules out any ambivalence that may have emerged in the ICT projects. Bank project documents emphasise the formal nature of the project management. In the projects, team members were selected according to their formal functions.

Many technology projects intend to reduce costs and re-engineer bank processes simultaneously. So, the main focus is on incremental ICT innovation. Nevertheless, a large number of projects launch pilots with the aim to gain organisational and technical experiences about particular bank settings.

New ICT projects are embedded in the entrenched bank structures. Consequently, in the first place, German change agents perform formal roles such as CEO, project manager, manager, consultant, developer and revisor in technology projects. CEOs are involved for various reasons. Firstly, they ensure that the organisational strategy is considered

within ICT projects. Thus, a CEO role is reflected in a temporary project role such as strategic planner. Secondly, they provide the credibility for the projects because technology projects are run on a temporary basis and on a global scale. In such cases, they act as project managers. Thirdly, the re-engineering of organisational processes parallel to the introduction of ICT innovation requires backing at higher hierarchical levels. A project manager is accountable for an ICT project. Consequently, a project manager is more concerned with day-to-day activities such as coordinating resources and delivering project documentation. Project managers are supported by other change agents in their roles as managers, consultants and developers. These professionals offer specialist knowledge demanded in technology projects which is reflected in their roles as coordinator, provider of records, implementer, adviser, analyst, programmer and knowledge promoter. Some banks specify those roles by inserting a function name before a job title. Revisers verify whether the change process within technology projects was executed in accordance with set organisational standards. So, their role is of a reviewer.

Apart from those formal activities, often the internal and external change agents maintain informal contacts. Over time, the informal contacts in many cases lead to the formation of an informal network. Change agents play pivotal informal network roles such as influencers and knowledge promoters. While in an internal informal network change agents try to accelerate the diffusion and adoption of innovation, in an external network they exchange ICT knowledge quickly.

The time frames of diffusion and adoption vary. The adoption time depends on the formal and informal change agents' roles, bank settings and the type of ICT innovation. It is evident that in every project management stage, the diffusion of innovation occurs, spread by change agents and other team members. Many of those new suggestions were rejected by certain groups. It emerges that the adoption processes take longer than the completion of a particular project management stage. Due to the set standards, engagement of various global groups and comprehensive project documentation, the

initiation and execution stages take longer than other project management stages in the German banks.

## 6.4. Summary of private sector case studies

This section outlines the main points that have been drawn from ICT change agents' activities and ICT projects in Australian and German private sector settings. Private sector companies apply new technologies to remain competitive in global business. This is evident in a large number of technology projects aimed to reduce costs and at the same time re-engineer organisational processes. The ICT projects need to consider the international regulations such as international accounting standards. Also, many of those projects manage and implement incremental ICT innovations on a global scale. Consequently, those projects are commenced with pilots. In the pilot process, change agents test new technologies and learn from those experiences related to the target technical and organisational settings.

In Australia and Germany, there is a frequent engagement of change agents within technology projects in whose job titles the term "Chief" or "Manager" are incorporated. A chief provides the credibility for a temporary ICT project on a global scale and is an advocate at the higher hierarchical structure level due to fact that the organisational processes are re-engineered in many projects at the same time. Thus, a chief role is reflected in a temporary project role such as strategic planner. In Australia, in some strategic relevant projects, a general manager acts as a project manager, whereas in Germany it is a CEO. A project manager is accountable for the task planning and coordinating of resources. A manager offers the expertise which is required in particular project stages. Therefore, the role of a manager is reflected in a knowledge promoter, planner, implementer, tester, consultant and provider of records. Some formal job titles of change agents are specified through a particular extension, for example, before the job title "Manager" the extension "Implementation" is inserted.

A large number of technology projects demand additional know-how in a specific field. In Australia, this is encompassed in the role of a manager. So, the term “Manager”, as discussed above, embraces multiple project roles. In Germany, apart from a manager, it could be a role of a consultant or developer. The job title “Consultant” encloses the analyst, programmer, adviser and knowledge promoter roles, while a “Developer” acts usually as a knowledge promoter. So, in German technology projects the formal roles tend to be defined before a project is launched. In German ICT projects, change agents are expected to document the formal project activities. This is reflected in change agents’ roles such as provider of records. The project documentation is reviewed by a reviser.

Apart from a great variety of those formal roles, very often the internal and external change agents in Australia and Germany also perform informal roles. These informal roles emerge from informal contacts. Over time, the informal contacts in many cases form informal networks. Change agents play pivotal informal network roles such as influencer, knowledge promoter and facilitator. These informal network roles are performed within internal and external networks for two main reasons. Firstly, change agents use internal informal networks to accelerate the diffusion of innovation across extended organisational boundaries. Secondly, in external informal networks change agents advance and exchange their technology know-how quickly.

In both countries, depending on the formal and informal change agents’ roles, organisational settings and ICT innovation, the time period of diffusion and adoption processes differ. It is evident that in every project management stage, the diffusion of ICT innovation takes place, spread by change agents and other team members. Many of those ICT innovations are rejected by particular groups. Sometimes, opinion leaders help with diffusion and adoption. It emerges that the adoption processes take longer than the completion of particular project management stages. In the Australian private sector, due to an increasing number of set standards, competition for project budgets and interaction with global counterparts in technology projects, the initiation and

planning stages take longer than the other stages. In contrast, in the German private sector, these are the initiation and execution stages. The initiation stage takes longer for the same reason as in Australian companies in response to set standards, competition for budgets and engagement of various global groups, whereas at the execution stage German companies demand comprehensive project documentation. In German companies, the external change agents incorporate their project experiences at the planning stage that helps to shorten the planning time frame.

In Australia and Germany, private sector technology projects are centred on project management standards. These new routines aim to enhance the implementation of new technologies. The project management strategy is also reflected in project documents. In particular, project documents illustrate the formality and planning within technology projects. The set standards exclude individual learning activities. In addition, German private sector companies apply anglicised traits expressed in the English language which are included into technology projects without explanation. The patterns emerging from Australian and German change agents' behaviour within different organisational settings will be discussed in the next chapter.

# 7. CHAPTER SEVEN: PATTERNS OF ICT CHANGE AGENTS' ACTIVITIES

## 7.1. Introduction

In order to identify patterns, in the previous two chapters, four case studies regarding ICT change agent operations within different organisational settings were analysed. It emerges that in the public and private sectors of Australia and Germany, there are similarities and differences relating to ICT technologies and change agents' activities within technology projects.

Australian and German public sector organisations lag in the uptake of new technologies compared to their respective private sector companies. This is reflected in the time taken to introduce ICT innovations like N-Tier and locking-in PC technologies which were adopted from the private sectors and brought into technology projects by private sector change agents. These technologies were incremental innovations which aimed to reduce costs. In addition, in both sectors, pilot projects were launched to reduce budget costs of subsequent projects, for example, by developing a proto-type and familiarising with new technologies in the target organisational setting. Through the testing approach, pilots also allowed more accurate planning of resources, budgets and tasks within subsequent projects that were embedded in organisational structures.

## 7.2. Roles in organisational structures

Case studies in Chapter Five and Six show that the formal roles of change agents are embedded in job titles within organisational structures. It is interesting to note that only a few change agents have identical job titles in the public and private sectors, for example, project managers, managers, consultants and software developers (see Table 18). They could be employed as internal or external change agents. Project managers, managers, consultants and software developers act as technology change agents on a long-term basis supported by change agents whose activities show a short-term engagement, for example, to provide specific know-how related to the organisational settings. As a result, the job title names of those change agents expose their original setting in which they undertake the main tasks. In the public sectors, the change agents who act on a short-term basis have titles such as managing directors, directors, managing lawyers and officials in charge, whereas in the private sectors, the titles are CEOs, chiefs, general managers and revisers.

Table 18: Change agent job titles within organisational structures

| **Change agent job titles within public sector organisational structures** | **Change agent job titles within private sector organisational structures** |
|---|---|
| Managing director, director, project manager, manager, consultant, managing lawyer, official in charge, software developer | CEO, chief, general manager, project manager, manager, consultant, reviser, software developer |

As depicted in Table 18, a change agent is a broad term that embraces various fixed job titles. All aforementioned change agents have in common that they are catalysts for introducing new ICT technologies within projects.

## 7.3. Roles in ICT projects

Change agents perform a variety of roles within an ICT project. At every project stage, change agents perform a few identical project roles in the public and private sectors (see Table 19). In both sectors, these roles are core project roles because they are closely linked with the project standard requirements and ICT innovation at that particular project stage. For instance, at the initiation stage, change agents lead off the change process and facilitate learning about new ICT technologies by acting as an initiator of change and a knowledge promoter. The planning stage requires the accurate planning of tasks, resources and budgets beforehand within particular ICT innovations. So, the core project role of a change agent refers to a planner. At the execution stage, the planned tasks are required to be carried out. An effect of this is that change agents design a product in a software developer role in order to meet clients' demands. These project tasks need to be accomplished before a project is terminated at the close-out stage.

Besides the activities related to core project management and ICT innovation, the organisational requirements need to be met at every project stage which are reflected in roles guided by organisational settings. In order to argue this, Table 19 serves as a starting point. In the public sector, there is a repeating pattern of governor, team builder, relationship builder and marketer roles. A governor provides official recognition of the course of a technology project and ensures that an ICT project is executed according to a set of government regulations and project standards. The set standards demand the participation of various groups at distinct project stages. So, change agents need to shape a project team several times in the roles of a team builder and relationship builder. Afterwards, they advertise a new ICT product or service in a marketer role. Additional roles, such as quality manager and risk manager, are also framed around a particular organisational setting. For example, the role of a quality manager is concerned with whether an ICT project is documented in accordance with set organisational standards, whereas a risk manager calculates the factors which may occur in the project

process and then adjust the project plan. As a result of these specific public sector requirements, both in Australia and Germany, the initiation and execution stages take longer than the other two project stages.

While the public sector is based on broad diversity, the private sector facilitates a more focused approach which is reflected in less project roles concerned with organisational settings. Nevertheless, in the private sector, there is a repeating pattern of strategic planner, adviser and coordinator roles (see Table 19). Private sector change agents accomplish set project goals in accordance with a corporate strategy. As a result, they need to consider how their future projects will fit into a company and recommend a suitable ICT solution in a strategic planner role. Additionally, change agents act as advisers by providing specific knowledge about ICT innovation. Usually, private sector companies launch their projects across organisational boundaries. So, change agents are challenged to bring distinct virtual groups into appropriate relation with the organisation to ensure effective operation. An effect of this is that the coordinator role has many activities of a recurring nature. The private sector is primarily focused on the financially measurable project outcomes which results in tester, provider of records and reviewer roles. In the tester role, change agents verify ICT innovation and make changes if necessary, whereas in the provider role of records and reviewer, they monitor project performance.

Table 19: Change agents' roles at the project stages

| **Project management stages** | **Project management roles in the public sectors** | **Project management roles in the private sectors** |
|---|---|---|
| Initiation | Diagnostician, initiator of change, governor, designer of a business model, consultant, knowledge promoter, team builder, relationship builder | Strategic planner, analyst, initiator of change, technology architect, knowledge promoter |

Table 19: (continued). Change agents' roles at the project stages

| Project management stages | Project management roles in the public sectors | Project management roles in the private sectors |
|---|---|---|
| Planning | Planner, governor, quality manager, risk manager, analyst, knowledge promoter, software developer | Strategic planner, project manager, planner, adviser |
| Execution | Planner of resources, governor, knowledge promoter, team builder, relationship builder, motivator, software developer, trainer, marketer | Coordinator, adviser, implementer, software developer, provider of records |
| Close-out | Sponsor, marketer, terminator | Knowledge promoter, tester, reviewer, coordinator, terminator |

As a result of differences in the public and private sectors, Table 19 shows that public sector change agents perform more formal project roles in the first three project stages than in the last one, whereas private sector change agents engage in a constant number of formal project roles over all project stages.

A project is based on team work. As a result, different types of change agents participate at every project stage. Their roles are impacted by a project management framework, organisational settings and ICT innovation. The fast-changing nature of ICT technology requires an ad hoc exchange of new know-how which is accumulated in informal networks.

## 7.4. Roles in informal networks and ICT diffusion

Informal networks play a pivotal role in the diffusion of ICT innovation. The interrelationship among ICT diffusion components and informal roles are presented in Table 20 which fuses two distinct tables emerging from the public and private sector settings. Each of the four diffusion components (ICT innovation, communication channels, adoption/rejection time and social system), together with the informal networking, take place along distinct project stages. These components are discussed next.

### ICT innovation

Every ICT project in both sectors involves different degrees of novelty. Some projects deal with radical innovations while others are concerned with incremental changes in terms of software up-dates. At every project management stage, change agents and other team members suggest new ideas. Suggestions are related to new technologies and changes regarding processes within organisational structures. In many cases, new technologies are introduced parallel to the adjustment of processes which lead to incremental innovation. The project objective towards innovation depends on the sector. In the public sector, organisations aim to improve services for the communities, whereas private sector companies intend primarily to boost profits.

### Formal and informal communication channels

At every project management stage, change agents rely mainly on formal communication channels, which are: face-to-face, email and phone in both sectors. While those channels remain constant over the project management stages, the supportive channels vary. On the other hand, the principal informal communication channel is centred on face-to-face communication. While the main informal communication of face-to-face is applied over all project management stages, the use of other supportive informal channels fluctuates.

Public sector change agents use a larger number of formal and informal communication channels than their counterparts in the private sector. The reason is grounded in public sector guidelines which assign fixed communication channels in certain situations and this also impacts on change agents' behaviour towards a frequent use of distinct informal channels. Similarly, in both, the public and private sectors, it takes time until new ICT technologies are adopted or rejected on a formal or informal basis.

**Adoption/ rejection time**

Some individuals adopt new ideas quicker than others. How fast the ideas are taken on by employees or clients depends on i) the nature of innovation, ii) the person who made the new suggestion and iii) the adoption group. It emerges that in both sectors, the standard project management framework is primarily concerned with the project outcome delivered by a project team. An effect of this approach is that mainstream potential adopters who need to use new ICT technologies are excluded from the formal process.

**Social system**

Both sectors show the existence of different adopter groups who are part of a social system reflected in an ICT project. A technology project consists of a visible formal social system including a formal structure and a hidden informal social system reflected in its own informal structure. It is apparent that an ICT project in both public and private sector environments is the standard process which engages team members on a formal basis from various departments. In both sectors, every project is part of the vertical organisational hierarchy where formal leaders are acknowledged according to an organisational chart. On the other hand, informal structures are hidden and led by opinion leaders. Usually, every group has a different opinion leader who influences group members towards adoption or rejection of innovation. It emerges that change agents who did not only rely on standard project procedures learnt from their previous project experiences and engaged opinion leaders who accelerated the diffusion and adoption of new technologies.

The private sector employs internal and external change agents coming from the private sector settings, whereby the public sector hires external private sector change agents to support their own internal change agents and also to bring new ICT innovation into the public sector projects.

In both sectors, very often, change agents request new ICT know-how on an ad hoc basis which is not available within their organisational settings and move forward through informal networks.

**Role within informal networks**

Even though informal networks are driven by ICT innovation and are out of organisational control, nevertheless, these informal roles show similar patterns to formal project roles as they depend similarly on project stages and organisational settings. In the public sector, change agents play more informal roles at the first three project stages than in the last one, whereas the informal roles of private sector change agents remain virtually unchangeable over the project stages. It is interesting to note that the role of a knowledge promoter is performed formally and informally in both sectors.

The diverse requirements and political environments of the public sector impact on informal activities which in turn result in varying informal roles such as bridge, central connector, boundary spanner, knowledge promoter and gatekeeper. In contrast, private sector companies expect change agents to continually earn profit for the firm. Consequently, they need to acquire new knowledge which they can share with others aimed at selling ICT products and services. So, their behaviour is centred on influencer, knowledge promoter and facilitator roles.

Table 20: Diffusion components and network roles in the public and private sectors

| Project management stages | Elements of ICT diffusion and network roles in public sector settings | | | | | | Elements of ICT diffusion and network roles in private sector settings | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Different ICT innovations diffused (yes/no)** | **Formal communications channels (main/supportive)** | **Informal communications channels (main/supportive)** | **Core informal roles within informal network** | **Time frames of adoption/ rejection varied (yes/no)** | **Social system (internal/ external)** | **Different ICT innovations diffused (yes/no)** | **Formal communications channels (main/supportive)** | **Informal communications channels (main/supportive)** | **Core informal roles within informal network** | **Time frames of adoption/ rejection varied (yes/no)** | **Social system (internal/ external)** |
| Initiation | Yes | Main: face-to-face, email, phone<br>Supportive: internal post, external post, fax, interactive software, using another person as a messenger | Main: face-to-face<br>Supportive: email, phone, using another person as a messenger | Bridge, central connector, boundary spanner | Yes | Internal, external | Yes | Main: face-to-face, email, phone<br>Supportive: video conferencing, fax | Main: face-to-face<br>Supportive: email, phone | Influencer, knowledge promoter | Yes | Internal, external |
| Planning | Yes | Main: face-to-face, email, phone<br>Supportive: internal post, external post, fax, interactive software | Main: face-to-face<br>Supportive: email, phone, interactive software | Central connector, knowledge promoter, bridge | Yes | Internal, external | Yes | Main: face-to-face, email, phone<br>Supportive: fax, using another person as a messenger | Main: face-to-face<br>Supportive: email, phone, using another person as a messenger | Knowledge promoter, influencer | Yes | Internal, external |
| Execution | Yes | Main: face-to-face, email, phone<br>Supportive: internal post, external post, fax, interactive software, using another person as a messenger | Main: face-to-face<br>Supportive: email, phone, internal post, external post, fax, using another person as a messenger | Boundary spanner, central connector, gatekeeper, knowledge promoter | Yes | Internal, external | Yes | Main: face-to-face, email, phone<br>Supportive: internal post, external post, interactive software, fax | Main: face-to-face<br>Supportive: email, phone, interactive software | Knowledge promoter, influencer | Yes | Internal, external |
| Close-out | Yes | Main: face-to-face, email, phone<br>Supportive: internal post, external post | Main: face-to-face<br>Supportive: email, phone | Gatekeeper | Yes | Internal, external | Yes | Main: face-to-face, email, phone<br>Supportive: interactive software | Main: face-to-face<br>Supportive: email, phone | Knowledge promoter, influencer, facilitator | Yes | Internal, external |

## 7.5. Roles and national characteristics

Nationality (Australia and Germany) was not initially expected to play a role beyond its use as a conceptual setting for the case study analysis. The national cultures of both countries are outside the scope of this study. However, through the process of analysis it has become apparent that even with a standardised project management framework and similar ICT diffusion elements, a few national characteristics emerged.

For Australian public sector change agents, the formal and informal communications are distinct processes. In contrast, for German public sector change agents the informal process is embedded in the formal. So, in Germany the change agents who operate in the public sectors perceive their informal conversations as a part of a short formal process (Klein Dienstweg) because they serve formal purposes. This assists Germans to review the formal event from another perspective and find a creative solution quickly.

A further difference is that Australian change agents within private sector settings document less than Germans in similar organisational settings. The reason is closely linked to the value system of Australian private sector change agents who give priority to the ICT implementation. This helps Australian private sector companies to shorten the execution stage. In contrast to this, German private sector companies believe that planning is a key to a successful project outcome. An effect of this is that they engage external change agents at the planning stage who incorporate their previous project experiences with the aim to shorten the planning process. As a result, the German private sector planning stages are shorter. Australian and German private sector change agents view informal conversations similarly as separate processes. This might be the case because German private sector companies operate on a global scale dominated by the English language.

Similarly, the German public and private sectors have embraced the Anglo-Saxon principles which are reflected in the frequent use of English terminology in the German language. The Anglo-Saxon approach is a new phenomenon for the German public sector which is brought into public sector projects by private sector change agents.

## 7.6. Summary of the overall patterns

This section recapitulates the overall patterns emerging from change agents' activities in ICT diffusion within technology projects in public and private sector environments.

Public and private sector change agents need to act in accordance with set project management and organisational standards. While public sector change agents are influenced by government guidelines their private sector counterparts are impacted by a corporate strategy that is profit-driven. Similarly, in both sectors technology projects are predominately initiated for cost-cutting purposes.

In both sectors, the role of a change agent is rooted in an organisational structure, project management and ICT diffusion. While the organisational structure change agent role is embedded in a job title and visible in an organisational chart, project role of a change agent is intertwined with project management stages. In ICT diffusion, a change agent predominately performs the role within informal networks.

Due to that a technology project is carried out according to set project management standards, therefore, organisational guidelines emphasise formal project activities. Nevertheless as identified, in obscurity the ICT diffusion process, including ICT innovation, communication channels, adoption/rejection time and social system, takes place.

The implications of these aforementioned patterns together with the extant literature on this topic will be discussed in the next chapter.

# 8. CHAPTER EIGHT: DISCUSSION

## 8.1. Introduction

This chapter discusses the patterns that emerged from the previous chapter in the context of the related literature on this topic.

More generally, Rosenau (2000) observes that public sector organisations are centred on government guidelines, involving employees collectively in the process of decision making with the aim to minimise risks. This DBA study found that this is also the case in the process of innovation where holistic decision making takes place. Nevertheless, the innovation process is impacted by political agendas of the incumbent government. So, the state government drives innovation to gain competitive advantage over other states (Feller, 1988). This research identified two ambitious states which foster innovation to obtain competitive advantage: The State of Victoria in Australia and the State of Hessen in Germany. Spurred on by political agendas, government agencies use ICT innovation to create new services for the local communities. ICT innovation enables the delivery of online government services leading to the development of e-government. Blumhardt (2004) argues that Australian state agencies were involved in e-government projects earlier than Germans due to the Australian proactive policy to foster ICT innovation. German state agencies are now catching up by initiating a large number of technology projects simultaneously. This DBA study found that this is reflected in radical ICT innovations which were diffused and implemented, for instance, within public sector projects in the State of Hessen. Moreover, it was discovered that the fundamental shift to German e-government is driven by political forces and external change agents which are guided by Anglo-Saxon principles.

To remain up-to-date, private sector companies launch a remarkable number of technology projects across organisational boundaries. The driving force behind those projects is the global market. The purpose of private sector companies is to make profits by taking risky actions (Rosenau, 2000). Currently, private sector companies apply new ICT technologies to create additional products and services which could compete

globally. The new products and services are developed on cutting edge ICT technologies to boost profits through new ICT projects

Despite the differences in focus, public and private sectors interact with each other in different ways, for example, through similar suppliers and consumers (Cunningham and Froeschl, 1999). Borins (1998) argued that both sectors use similar ICT technologies. However, this does not happen at the same time. This DBA study discovered that when comparing different innovative approaches, the public sector is a follower of the private sector when it comes to ICT innovation. It is reflected in the best industry practices adopted by the public sector that came from the private sector companies: N-Tier and locking-in PC environment technologies. Nevertheless, there are some exceptions among public sector agencies. By way of illustration, Deutsch (1985) referred to the armed forces departments which were the leaders in the development of radical innovations. Afterwards, those radical innovations were commercialised in the private sector settings and later in all public sectors.

Similarly, both sectors rely on ICT change agents for the diffusion, management and implementation of ICT innovations. The roles of the public and private sector ICT change agents are multi-faceted and embedded in an organisational structure, project management and ICT diffusion. Each will be discussed in the following sections.

## 8.2. Comparing roles in organisational structures

ICT change agent formal roles are fixed within a vertical organisational hierarchy and visible in a job title. This DBA study discovered four identical ICT change agent job titles in both sectors: project manager, manager, consultant and software developer. These change agent job titles are not novel roles, but rather a refined notion rewarded to individuals whose work implies long-term change agent activities within technology projects. While Kendra and Taplin (2004) suggested a project manager within ICT projects, the role of a manager as ICT change agent was examined by Johannessen (1994) and of an ICT consultant by Winston (1999). In words of Weiss and Anderson (2004), the ICT professionals are change agents. In this case, the job title of a software developer falls into the category of ICT professional. These roles could relate to the

internal or external change agents. Internal and external change agents have already been examined by Case, Vandenberg and Meredith (1990).

Moreover, this research identified individuals whose job titles indicate other operations and whose ICT change agents' activities are of a short-term nature. The job titles of these ICT change agents depend on the sector. By way of illustration, in public sector settings, short-term ICT change agents are managing directors, directors, managing lawyers and officials in charge, whereas in the private sector, they are CEOs, chiefs, general managers, and revisers. These individuals bring into ICT projects specific organisational knowledge which enriches technological change. It is apparent that some ICT change agents have a double function, for example, managing directors, directors, CEOs and chiefs are leaders within organisational structures and act occasionally as ICT change agents when it comes to technological innovation. Their distinct job titles emphasise project activities in accordance with the sector. For instance, managing directors and directors ensure that public sector guidelines are considered within technology projects, whereas CEOs and chiefs promote a corporate strategy. Research by Grant and Cibin (1996) has shown that the Chief Executives can act as short-term change agents.

This DBA study discovered two distinct types of ICT change agents whose job titles reveal the time period spent within technology projects. The first type is described as a long-term ICT change agent, whereas the second one is a short-term ICT change agent. The differences point out that both types of ICT change agents have accumulated distinct knowledge which is demanded in ICT projects.

## 8.3. Comparing project roles

Commonwealth Department of Communications, Information Technology and the Arts (2003) suggest using ICT for strategic guidance. This DBA study points out that both sectors initiate a large number of ICT projects to reduce costs. So, projects intend to deliver new products and services in a more efficient and effective manner as already suggested by Cleland and Ireland (2002). The strategy is present in project objectives,

project outcomes, ICT change agents' discussions and preferences for new technologies which support cost savings.

To reduce costs, and at the same time to minimise risks, many projects commence with a pilot. A pilot identifies a range of issues pertaining to technological innovation and organisational settings. The pilot process provides a test case and learning experiences. The findings and experiences of a pilot form the basis for guidance of subsequent projects.

This research shows that subsequent projects in both sectors apply standardised project management frameworks, as proposed by Buttrick (2005) and Hartley (2003), emphasising defined project objectives and well planned resources and budget. Similarly, the Western Australian Innovation Centre (2005) suggests four project management stages including initiation, planning, execution and close-out. Some ICT change agents refine these stages into smaller phases for monitoring purposes. Nevertheless, the public and private sector projects include systematic work, drawing on existing knowledge from previous projects.

In this DBA study, emerging ICT change agent role patterns are positioned alongside the project management framework of Western Australian Innovation Centre (2005) to discuss the similarities and differences between sectors. In both sectors, ICT change agents perform identical core project roles at every project stage, for example, at the initiation stage, ICT change agents are initiators of change and knowledge promoters, whereas at the planning stage, they act as planners. The role of a software developer is performed at the execution stage. With the terminator role, ICT change agents complete a technology project. These formal project change agents' roles are already discussed in distinct bodies of literature and in the different contexts. Rogers and Shoemaker (1971) highlighted the roles of initiators and terminators in the process of diffusion of innovations, while the role of a planner was discovered by Beckhard (1969). In the 1960s, change agents planned different activities, for example, distinct tasks related to organisational processes, compared to an ICT project context, the planning is specifically about ICT innovation, resources, timelines and budget. A developer role

within organisational processes is suggested by Hamlin, Keep and Ash (2001), while this DBA study found that an ICT change agent in the role of a software developer is responsible for the design of new ICT application. Moreover, this role can be reflected in the job title as noted previously and, at the same time, present the function of an ICT change agent at the execution stage. An additional core project role is of a knowledge promoter that can be traced back to the findings by Bessant (1999) and Witte (1973) investigated in an innovation process.

Besides the similar core project roles in both sectors, there are distinct project roles grounded in organisational settings. By way of illustration, Hatton (2001) observed the role of a diagnostician, while Buchanan and Boddy (1992) added the role of a team builder in public sector settings. In the private sector, Varney (1977) suggested the role of a strategic planner. This DBA study discovered that a diagnostician role is performed once at the beginning of an ICT project to identify specific public sector needs, whereas the roles of a team builder and strategic planner have a recurring nature. In response to public sector guidelines which request the participation of varying groups at distinct project stages, ICT change agents need to re-build a project team. In contrast, public sector companies demand the consideration and execution of a corporate strategy within technology projects.

More generally, other formal change agents' roles are discussed in the literature. The roles of a relationship builder and motivator are rooted in 1971 and are suggested by Rogers and Shoemaker (1971). Baker (1994) views a change agent as a marketer. Hunt (1972) highlights the role of an analyst. The change agent roles of a trainer and adviser are proposed by Hamlin, Keep and Ash (2001). Buchanan and Huczynski (1997) highlight the roles of a sponsor and implementer of change. This research suggests that these roles are performed by ICT change agents at distinct ICT project stages and are embedded into particular organisational settings. By way of illustration, at the execution stage, public sector ICT change agents build relationships and motivate other employees to make their contribution to an ICT project with the aim that the change agents can complete the defined technology tasks. They also educate employees in a trainer role about new ICT products and services that are developed at the execution stage. Further

effort in the marketing is necessary until a project is terminated. At the end of an ICT project, in the role of a sponsor, a project owner verifies the project outcome.

In the private sector, the roles of an analyst, adviser and implementer are highlighted in ICT projects. At the initiation stage, private sector ICT change agents examine in detail new ICT technologies in terms of return on investment before presenting a business case. Prior to the implementation of a solution, change agents review ICT innovation with respect to the financial outcomes.

In addition to discussed formal change agents' activities, this DBA study found that both sectors respond to technological change in different project roles. For example, public sector ICT change agents highlight the role of a governor as a result of e-government activities within ICT projects, whereas their private sector counterparts regard the role of a technology architect as an essential role at the beginning of an ICT project. A technology architect is the new role that emerged as a consequence of fusing different ICT technologies into a technology system that needs to be in accordance with a corporate strategy.

Organisational settings and project management stages impact on change agents' behaviour. By way of illustration, public sector ICT change agents perform more project roles than private sector ICT change agents. This is in response to the nature of the public sector which is evidence-based and requires a large variety of project documents due to varying public sector regulations. Osborne and Brown (2005) observe that the innovation processes in public sector organisations are affected by different political agendas and interests. This research confirmed this observation by arguing that due to distinct politics involved in an ICT project, public sector ICT change agents need to perform more project roles than their counterparts in the private sector. Consequently, public sector ICT change agents make many attempts to convince team members to pursue the same project objectives.

In contrast, private sector ICT change agents play less project roles because the private sector companies judge change agents on the outcomes. They need to present results

which are summed up in the role of a provider of records. Basically, private sector companies aim to increase profits, so that the project objective is transparent to all team members. ICT change agents centre on fewer roles in depth because their project activities are assessed based on profits and deadlines.

This research found that both public and private sectors apply similar standard formal project management frameworks which encompass convergent and divergent project roles. Convergent roles are core project roles, for example, initiator of change, knowledge promoter, planner, software developer and terminator that are performed by change agents in both sectors. The core roles conjunct project stages and ICT innovation, while divergent project roles are grounded in organisational settings. As a result, public sector ICT change agents are more likely to perform the roles of a diagnostician, governor, sponsor, team builder, relationship builder, motivator, trainer and marketer, whereas private sector ICT change agents tend to focus on a few project roles such as strategic planner, technology architect, adviser and coordinator. In both sectors, despite similarities and differences, in technology projects ICT diffusion takes place.

## 8.4. Comparing the processes of ICT diffusion

In reviewing the Rogers' (1995) diffusion process, including innovation, communication channels, adoption/rejection time and a social system, it was not evident how these diffusion elements could correlate with an ICT project because they were examined outside of the ICT diffusion and project management framework. An effect of this was that at the beginning of this study, it was not clear what outcome towards ICT change agents' activities will emerge.

This DBA study discovered that at every ICT project stage, change agents and often other team members spread ICT innovations via communication channels and it took time until those new suggestions were adopted or rejected by a social system. These four components that underpin the process of ICT diffusion and the networking within technology projects are discussed below.

**Nature of ICT innovations**

Dodgson (2000) observes that innovation includes dysfunctional and abnormal processes. This is especially the case when multiple innovations occur at the same time (Jorde and Teece, 2005). This DBA study found that in the public and private sectors, multiple innovations emerge at every project stage as proposed by change agents and team members. The new ideas were usually about ICT technology and organisational settings. Within ICT projects, very often, new technologies are adjusted in accordance with organisational processes, or organisational processes need to be re-engineered to suit contemporary technology and client demands. This practice is not acknowledged in the guidance towards successful project management as suggested by Mantel, Meredith, Shafer and Sutton (2005). The standard project framework suggests a smooth process by following the checklist (Buttrick, 2005), whereas the multiple innovations disconnect with project management stages and for a certain period of time create a disorder. In response to these innovative turbulent processes, ICT change agents communicate via formal and informal channels.

**Nature of formal and informal communication channels**

This DBA study discovered that ICT change agents use various communication channels to suit the situation. Public and private sector ICT change agents rely on three main formal communication channels: face-to-face, email and phone at every project stage. In addition to those channels, private sector organisations set more communication standards that need to be considered within projects than their private sector counterparts. As a result, public sector ICT change agents apply a great variety of formal communication channels. This DBA study shows that a great number of formal communication channels impact directly on informal channels. So, public sector ICT change agents use more distinct informal paths which result in more informal communication channels. Similarly, in both sectors, the main informal communication channel is face-to-face, which is enriched by other media such as email, phone or interactive software when required within informal networks.

**Nature of informal network roles**

The findings by von Stamm (2003) suggest that informal networks are pivotal for new projects because of knowledge acquisition. This DBA study advances her findings by arguing that, despite differences in the focus of public and private sector organisations, the mainstream of ICT change agents operate within informal networks. The reason is deeply grounded in ICT innovation. The nature of ICT innovation is characterised by a short life cycle (Tidd, Bessant and Pavitt, 2005). As a result, ICT change agents need to be swift with knowledge acquisition, implementation and diffusion of ICT technologies. This is particularly evident in the ongoing role of a knowledge promoter in both sectors which dates back to the formal knowledge promoter role as suggested by Bessant (1999) and Witte (1973). It is interesting to note that, nowadays, this role is performed formally within project management, as noted, and informally within informal networks as a result to some disruptive ICT innovations. The disruptive phenomenon of new technologies is well examined by Christensen (1997). In other words, the hyper-speed of ICT innovation drives ICT change agents' behaviour towards informal networks. This emerged from discussions with public and private sector ICT change agents in Australia and Germany.

More generally, Awazu's (2004) research has suggested the roles of central connectors, boundary spanners, gatekeepers and bridges within informal networks. This DBA study shows that a variety of these roles are performed within informal networks by public sector ICT change agents. Prior to this research, Buchanan and Boddy (1992) stressed the importance of networking activities of public sector change agents without naming any specific network roles. As noted, the public sector is based on a democratic approach engaging competing parties for power, thus, ICT change agents need to unite counterparts and at the same time manage, diffuse and implement innovation. Therefore, they perform more diverse informal roles than their counterparts in private sector settings. Private sector ICT change agent informal behaviour is aligned to selling innovation which is rooted in the core roles of an influencer and facilitator. Both roles were in the literature discussed as formal activities: influencer (Rogers, 1995) and facilitator (Mantel, Meredith, Shafer and Sutton, 2005). However, this research identified that in both sectors, it takes time until people adopt or reject ICT innovation.

**Nature of adoption/ rejection**

In discussions with different types of ICT change agents, it became apparent that academics and practitioners apply different terms for people who need to adopt innovation. While academics (Bass, 1969; Rogers, 1971) label them adopters, practitioners call them users. Distinct terminology and argumentation impact differently on academic and practitioner approaches. For example, Rogers (1971) has shown that adopters fall into five different categories: innovators, early adopters, early majority, late majority and laggards. These groups differentiate themselves in behaviour towards the adoption of new ideas which are grounded in their different beliefs. A mainstream of academics on diffusion of innovation base their own research on Rogers (1995), for example, Brown and Venkatesh (2003) who conducted research on ICT diffusion and adoption.

Research by Rangaswamy and Gupta (2000) has suggested that a large number of practitioners are not used to academic diffusion thinking and, therefore, they cannot utilise it in their day-to-day activities. This DBA study found that this is also the case to date, for example, public and private sector organisations regard different adopter groups as one large group labelled as users. This approach is derived from a standard project management framework. As a result, the project team members adopt ICT innovation over distinct project stages, while the users are expected to adopt a new technology quickly after implementation.

This DBA study has identified the need to fuse Rogers' (1995) model with the practitioner framework (Western Australian Innovation Centre, 2005) because both approaches look at a social system from different perspectives.

**Nature of a social system**

Technology projects are run in accordance with the planned and formal processes. As a result, there is a strong focus on the controlling mechanism to calculate risks as suggested by Chapman and Ward (2003). Apart from standard project management (Western Australian Innovation Centre, 2005), this DBA study has shown that at every

ICT project stage, the processes of diffusion and adoption take place. Diffusion consists of planned and spontaneous processes (Rogers, 1995). An effect of this is that diffusion and adoption are "… a kind of *social change*, defined as the process by which alteration occurs in the structure and function of a social system" (Rogers, 1995 p. 6). He (1995, pp. 6-7) continues:

> When new ideas are invented, diffused, and are adopted or rejected, leading to certain consequences, social change occurs. Of course, such change can happen in other ways, too, for example, through a political revolution, through a natural event like a drought or an earthquake, or by means of a government regulation.

In other words, through diffusion and adoption or rejection of innovation, change in peoples' behaviour within a social system takes place. The social process includes uncertainty because it is not clear whether people will adopt new ideas due to that they preconceive ICT innovation beforehand. This DBA study found that ICT change agents who selected opinion leaders with similar values as future adopters were able to accelerate the process of ICT diffusion and adoption. The influence of opinion leaders is well documented in the literature (He, Xu and Sun, 2004; Chaney, 2001).

While this chapter has discussed various ICT change agents' activities, the next chapter will present the conclusion of this DBA study.

# 9. CHAPTER NINE: CONCLUSION

## 9.1. Response to research questions

The purpose of this DBA study was to investigate the three interrelated research questions which were identified as follows:

1. How does an organisational setting impact on ICT change agent activities?
2. What formal and informal roles do ICT change agents play in ICT diffusion within technology projects?
3. How does the ICT diffusion process relate to project management?

As noted earlier, this DBA study is among the first of its kind to examine technology change agents' activities in conjunction with an academic diffusion model (Rogers, 1995) and practitioner project management framework (Western Australian Innovation Centre, 2005). Responses to the above three research questions are addressed below.

**Response to research question 1.**

The activities of ICT change agents within projects are affected by organisational settings. This is the case in both the public and private sectors. While in public sector settings, ICT change agents' operations are more likely to be guided by a variety of regulations, in the private sector environment ICT change agents are more likely to be driven by a corporate strategy which is profit-oriented. Consequently, the differences in organisational settings impact on formal and informal ICT change agents' roles (see Response to research question 2.).

Usually, researchers have investigated change agents' operations regardless of organisational settings, for example, Meyerson and Scully (1995). Only a few studies (Weiss and Anderson, 2004) have investigated the correlation between an organisational setting and change agents' operations. Lack of research in this discourse has led to the widespread assumption that change agents' activities can be generalised to both sectors. This DBA study shows that this is the case for some project roles while other ICT

change agents' roles are clearly impacted by the differences between public and private sectors as discussed next.

**Response to research question 2.**

ICT change agents play various formal and informal roles. In both sectors, the formal ICT change agents' roles are derived from organisational structures and ICT project stages, while the informal roles are rooted in informal networks.

The roles of ICT change agents within organisational structures indicate whether the change agents perform long-term or short-term project roles. In both sectors, ICT change agents who operate on a long-term basis within technology projects have similar names, for example, project managers, managers, consultants and software developers. These formal roles could be internal or external and engage day-to-day project activities. Short-term project ICT change agents provide unique organisational knowledge on demand and are predominately occupied with other tasks outside an ICT project. Hence, their job titles reflect organisational settings in which they operate. For example, in the public sectors, they are managing directors, directors, managing lawyers and officials in charge, whereas in the private sectors, they are CEOs, chiefs, general managers and revisers who act as short-term project ICT change agents. Usually, the aforementioned leaders act as short-term ICT change agents within projects aimed to support long-term ICT change agents who are engaged in projects on a day-to-day basis.

Additionally, formal roles are intertwined with varying project stages. In both sectors, ICT change agents play core project management roles at every project stage. For example, ICT change agents act as initiators of change and knowledge promoters at the initiation stage, while their formal project roles refer to planners at the planning stage. At the execution stage, ICT change agents play roles of software developers and, at the last project stage, they complete ICT projects in the role of terminators. Apart from those core project management roles, there are other project roles which are guided by the objectives of particular organisational settings. For example, in the public sectors, these are the roles of governors, team builders, relationship builders and marketers,

while in private sector settings those project roles refer to strategic planners, technology architects, advisers and coordinators. These roles indicate that the public sector ICT change agents act in accordance with a governing system while private sector ICT change agents are primarily movers of an organisational strategy.

In both sectors, there is the role of a knowledge promoter that is performed on a formal and informal basis. The informal roles are linked to distinct project stages and organisational settings, for example, in the public sector, there is a variety of roles such as bridges, central connectors, boundary spanners and gatekeepers, whereas in private sector settings the role is limited to influencers aimed at accelerating ICT diffusion of technological innovation.

A large number of researchers (Baker, 1994; Cummings and Worley, 1997) have examined change agents without taking into account that they could act on a temporary basis. This DBA study illustrates that different types of ICT change agents exist who participate in technology projects on a short or long term basis. Furthermore, previous research overlooked the need to distinguish between formal and informal roles embedded in informal networks. The reason may be that change agents' operations were primarily focused on organisational change (Varney, 1977) rather than on ICT projects. As this DBA study shows, ICT change agents rely increasingly on informal networks within technology projects due to rapid-changing ICT innovation. This means that ICT change agents need to perform formal and informal roles in order to deliver set project goals. These findings together with identified formal and informal roles provide a framework for the planning of future technology projects within public and private sector settings (see Table 19 and Table 20).

**Response to research question 3.**

At every project management stage, ICT change agents and other team members diffuse ICT innovation in a planned or spontaneous process by using formal and informal communication channels and much time can elapse before ICT technology is adopted or rejected by formal and informal systems. Similarly, in both sectors, change agents apply identical formal and informal communication channels, for example, the main formal

channels are face-to-face, email and phone, while the main informal channel is face-to-face. Because public sector change agents are expected to operate in accordance with public sector guidelines, they use a larger number of further fixed formal communication channels than private sector change agents. The formal process impacts on informal paths, for example, public sector change agents communicate informally via a larger number of additional channels than their private sector counterparts. In both sectors, distinct groups exist that need to adopt ICT technology. While a standard project management framework emphasises participation in an ICT project according to an organisational chart, nevertheless, informal structures exist in both sectors. Those informal groups are led by opinion leaders who have the power to influence other group members towards the adoption of new technologies in particular organisational settings.

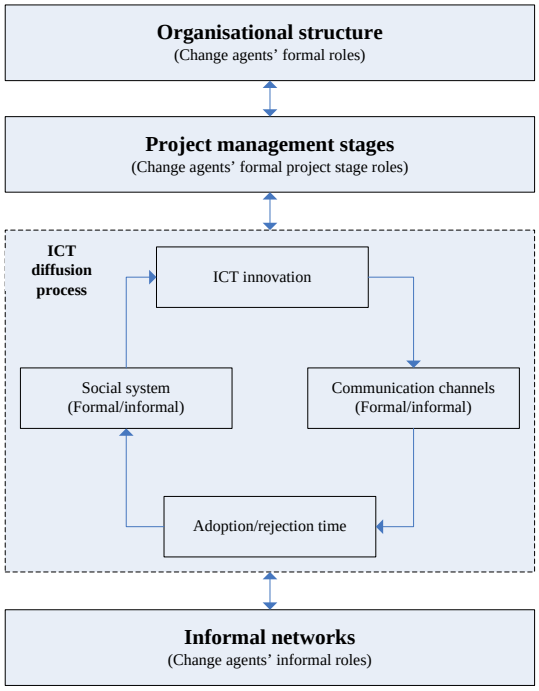
Prior to these DBA findings, Rogers' (1995) diffusion model and the Western Australian Innovation Centre's project management framework (2005) were applied separately. For example, Rogers' (1995) diffusion model was applied by academic researchers while practitioners used a project management framework along the lines of the Western Australian Innovation Centre (2005). This DBA study is the first which found that these distinct approaches occur as interrelated processes in ICT projects. The project management framework is used as a formal process aimed to assist in budget, resources and timelines planning, while in the diffusion process new ICT technologies are disseminated on a formal or informal basis. In other words, project management is more likely to be viewed as a planned process while ICT diffusion encompasses the planned and spontaneous processes. This DBA study has developed a model (see Figure 11) which shows that ICT change agents merge both approaches through their formal and informal roles for the diffusion, management and implementation of new ICT technologies within technology projects.

## 9.2. A model of ICT change agents' activities

The literature on project management neglects the nature of ICT diffusion and organisational settings. This DBA study found that ICT diffusion is a constituent part of technology projects influenced by public and private sector settings. In both sectors, as depicted in Figure 11, a technology project is characterised by interrelated components (organisational structure, project management stages) and processes (ICT diffusion, informal networks). Consequently, ICT change agents' roles are linked to these components and processes.

Within organisational structures, ICT change agents perform formal solo roles acknowledged in organisational charts. So, through their participation in technology projects, they connect ICT projects to organisational structures in the role of a linker. Within project management, ICT change agents' roles are formal team roles which depend on the nature of organisational settings, ICT innovation and project management stages. At every project management stage, the process of ICT diffusion takes place which includes ICT innovation, application of communication channels, adoption/rejection time by a social system. In the case that ICT change agents diffuse ICT innovation on a formal basis, they apply formal communication channels and formal social system structures. Otherwise, they use informal communication channels and informal paths within informal networks to spread new ideas about ICT technologies and to exchange know-how. As a result, ICT change agents perform the role of a linker to connect the process of ICT diffusion and informal networks to varying project management stages. The ICT change agents' roles within informal networks are impacted by the nature of ICT innovation, project management stages and organisational settings.

Figure 11: A model of ICT change agents' roles within technology projects




ICT change agents work as part of a project team. Figure 11 shows that once ICT change agents acquire technology information, they often disseminate it according to the process of ICT diffusion. The ICT diffusion process is, thus, the hub of a system of project communication which is closely interrelated with project management stages and informal networks.

Rogers (1995) concludes that the key role of a technology change agent is as a single linker that connects his/her company with the client environment. It is evident that the research by Rogers (1995) was carried out between 1962 and 1995, also before the major shift in the process of globalisation. As Longhi (2005, p. 89) confirms, the process of globalisation "… has however dramatically changed in the 1990s … towards a more integrated phase … The innovative process of the global firm becomes the heart of the globalization process, and is driven by a network of complementary activities". In other words, the process of globalisation has led to the integration of various sources of

knowledge across organisational boundaries. An effect of this is that both public and private sector ICT change agents integrate separate components (organisational structure, project management stages) and processes (ICT diffusion, informal networks) into an interactive process that accelerates ICT diffusion and increases the productivity of project management. Relating to this, as depicted in Figure 11, this study has developed a new model that demonstrates that an ICT change agent performs the multiple linker roles of these components and processes in order to deliver the set project outcome.

This new model which links Rogers' (1995) diffusion components to distinct project management stages aims to set a benchmark for future ICT projects. ICT projects are usually initiated to enhance diffusion and implementation of new technologies. So, the challenges facing the public and private sectors are not simply a matter of the completion of an ICT project according to the specified budget, resources and timelines, but also of the integration of ICT diffusion and multiple ICT change agents' activities in technology projects.

Implications and limitations of these findings, followed by suggestions for future research will be discussed next:

## 9.3. Implications for practice

There are potential sources of improvement in both public and private sectors, specifically related to policy, strategy and training that are derived from the above conclusions.

**Policy**

This study has discovered that the implementation of innovation and its diffusion are interrelated processes which involve uncertainty. Policy makers try to exclude uncertainty by publishing different regulations that need to be considered within technology projects. Many studies confirm that uncertainty is a part of innovation that cannot be avoided. A more adequate way of coping with uncertainty is recommended by van Geenhuizen and Nijkamp (2003), who conclude that policymakers need to regard

uncertainty as a chance to create guidelines which represent the contemporary situation in the process of innovation. In other words, regulations need to be guided by a deeper understanding of the nature of innovation facing practitioners. At the beginning, the guidelines can indeed increase innovative practices in the industry, for example, Moncrief (2008) points out that companies could be induced by government regulations to invest in new software applications. However, later on, when regulations become incorporated in other guidelines without further modification, they could slow down the innovation processes within project management. Further concern is expressed by House of Representatives Standing Committee on Science and Innovation (2006, p. 45) who argue that:

> Non-R&D inputs to innovation include, for example, market research, design skills, trial production and testing, prototyping and engineering experimentation, and software development. These non-R&D inputs are essential to innovation across all industries, but they are often a larger component of low-tech activities. Non-R&D expenditures on innovation are usually significantly larger than R&D expenditures, so they should not be neglected by innovation policymakers.

From this perspective, policymakers are urged to acknowledge incremental innovative practices derived from trial-and-error approaches outside of traditional research and development procedures. This is particularly the practice in technology projects. Consequently, policymakers need to rethink the scope of an innovation policy and suggest guidelines in accordance with the contemporary situation that is driven by knowledge-based economies.

**Strategy**

Woodside and Biemans (2005, p. 389) discuss innovative approaches in the context of strategic management and their implications for practice and recommend:

> The primary and continuing focus needs to be on crafting and executing streams of complementary and synergistic behaviours rather than focusing on simple checklists of do's and do nots.

In other words, organisations need to concentrate on actions which enhance the entire innovative process and do not explicitly rely on standard procedures.

The ICT project objectives and discussions with different types of change agents reveal that both sectors are heading towards a convergent strategy reflected in cost-cutting as a

new global strategic paradigm. This kind of strategy is insufficient in the current knowledge-based society, for two main reasons. Firstly, the strategy is easy to copy and reproduce globally which gives rise to companies which are specialised in imitation. Secondly, companies are increasingly dealing with demanding and sophisticated clients who fall into distinct adopter groups. Therefore, they need to be familiarised with new technologies on an ongoing basis. As a result, this study urges companies to enrich their cost-cutting approach with a new strategy stemmed from projects. Longman and Mullins (2004) suggest that projects are redesignated for the implementation of a new strategy. The new approach needs to be derived from project experimentation that Bowman (1999, p. 558) labelled as "Action-led strategy". Strategy based on actions implies that adopters of ICT innovation will be encouraged to take an active role. Libert and Spector (2008) predict that it will become trendy for companies to interact with the potential adopters virtually who could help to design new products and services. Thus, companies need to experiment with diffusion and adoption of innovations by engaging diverse groups in virtual environments for product development and marketing purposes.

While innovators and early adopters are faster at adopting new technologies, other groups such as early majority, late majority and laggards might need virtual guidance in this process. They need specific technical assistance, for example, case-based reasoning software that could help them to design their own preferred products or services.

Bowman (1999, p. 563) concludes that:

> … at an industry level often the real innovations stem from individuals or organisations that are outside the industry. These individuals or organisations are not constrained by the predominant mind-set or recipe in the industry …

Organisations could use the creativity and experiences of a social system to become more innovative. As an alternative to the standard development and diffusion processes, the ICT industry is urged to deliver software packages which can be customised by companies and their future adopters simultaneously. In that process, companies could develop new products and services and will be able to differentiate themselves from their competitors. This kind of innovative strategy could accelerate ICT diffusion and

implementation across organisational boundaries. Consequently, every company could create processes which suit their contemporary situation the best.

In addition, this DBA study shows that public and private sector ICT change agents' behaviours within informal networks differ. Public sector ICT change agents' informal roles include, but are not limited to, an ever-changing political environment while private sector ICT change agents usually act towards profit maximisation. In the future, both approaches may be essential for both sectors. In the case that the public sectors pursue a leading role in the innovation process, there is a need to employ ICT change agents who can sell new public sector products. On the other hand, private sector companies are facing globalisation which demands understanding and acting in accordance with local and national beliefs and politics. For example, in China, in order to make the business process work, the participation in different informal networks (guanxi) is a prerequisite (Wan, 2007). Chinese networking involves various parties, for instance, government bodies and business people. One of the Asian strategic advisers predicts that "China will be a formidable political, strategic and economic competitor" (Earl, 2007 p. 24). In response to that new global challenge, companies are advised to adopt the short formal German process (Klein Dienstweg) because it is faster to diffuse and implement innovation if the informal process is a part of a larger formal procedure. Moreover, private sector companies need to hire public sector ICT change agents who can operate within informal networks in highly political environments. This approach could contribute to a strategic fit within a Chinese domain.

**Training**

Currently, both sectors rely on standardised innovative activities captured in a project management framework. The set standards may lead to a lock-in situation where the technology is adopted because of path dependence and not because of the best possible technical solution (Hall, 2005). Moreover, with increasing technological and managerial standards, companies face the risk of becoming what Mintzberg (1993, p. 189) entitles a "*Professional Bureaucracy*". While a bureaucratic approach is adequate for a stable organisational setting, it is, however, unsuited to the contemporary situation reflected in increasing global rivalry which drives technological and organisational change. The

dynamics of organisational settings and fast-changing ICT innovation are not considered in various project management training materials. For example, training courses on project management teach the formal processes which are guided by various checklists (Buttrick, 2005). The principal findings of this research contradict those traditional project management courses by illustrating that ICT change agents' roles in projects are also affected by the nature of ICT technologies and organisational settings and not explicitly by standard project management frameworks. Only a few core roles at every project stage are performed in accordance with standardised project management. An effect of this is that the public and private sector organisations need to re-examine their current training courses. In order to accelerate diffusion, management and implementation of ICT innovations, new training programmes are required which incorporate this new model (see Figure 11) and emerging patterns regarding the differences in public and private sectors. Therefore, Figure 11 outlines the priorities reflected in components and processes within an ICT project in support of ICT change agents' roles and organisational goals.

## 9.4. Implications for research

This DBA study intends to inform theory in the bodies of literature regarding ICT change agents, diffusion of innovation, project management and ICT by providing evidence via case studies for how ICT change agents operate in public and private sector settings.

There is a remarkable number of valuable academic works for the industry in existence. However, those research studies need a practitioner interpretation because academics apply a different language to practitioners. Moreover, Professor Monro when interviewed, noted that academics and practitioners have divergent approaches (Karena, 2006). Academics are more concerned with processes while practitioners are focused on outcomes. The different approaches span the gap between these groups. To narrow that gap, universities need to modify their strategies towards an active engagement of practitioners in the research processes where practitioners could act as temporary academic researchers. Practitioners could reinterpret academic works, merge distinct bodies of literature in new ways and diffuse those innovative findings within industry.

This strategy may create a strong network between universities and industry and, at the same time, enhance diffusion of new ideas within communities.

As discussed previously, various studies (Volk, 2004; Charvat, 2003; Tani, 2001) show the high failure rate of ICT projects. As a result, there was a need to fuse academic and practitioner approaches into a new model which enhances the diffusion and implementation of ICT technologies. Consequently, this DBA study has developed a new model (see Figure 11) as an anticipated solution to reduce the high failure rate of ICT projects. Figure 11 delimits the theoretical framework for new research by underpinning the components and processes that have the potential to affect the success of ICT projects. The new model suggests that, apart from formal components and processes, the informal networks are increasingly used to achieve set formal objectives. Furthermore, as noted previously, the public and private sector settings impact on ICT change agents' operations. Therefore, future research needs to take these differences into consideration. This DBA study forms the hypothesis that ICT change agents' activities in accordance with standardised project management, and without considering the nature of ICT innovation and organisational settings, have contributed to the high failure rate of ICT projects. Clearly, there is a dire need for more empirical research in this area.

## 9.5. Limitations of the study

This DBA study was initially planned to develop a large snowball as the interior process which would run through the target organisations. As noted previously, this sampling strategy was not working. Consequently, many small snowballs were started at all vertical and horizontal hierarchy levels inside and outside of the target companies. As a result, the sampling process has engaged different types of ICT change agents and has enhanced the validity of the study. Nevertheless, the principal findings discussed previously need to be understood in the context of the following research limitations.

Firstly, this research is limited to ICT change agents within technology projects covering only their perspectives backed up by project documents. The DBA study used empirical data from the ICT projects within state agencies and banks, most of which

were within the State of Victoria in Australia and the State of Hessen in Germany. Hence, the findings will be of benefit to large, small and medium organisations to different degrees. While large companies employ internal and external ICT change agents, small and medium enterprises (SMEs) hire people who work as external ICT change agents for large companies with the aim to diffuse, manage and implement ICT. Consequently, large companies will profit from this research the most by using the findings for the training programmes of their internal and external ICT change agents while SMEs can primarily apply the research outcomes to their external ICT change agents.

Secondly, apart from ICT change agents there are other types of change agents, for example, change agents who alter national and organisational cultures. Those types of change agents are outside the scope of this study.

Thirdly, it is also important to note that my reflection papers and ICT change agent experiences are gained from German public and private sectors. Work experiences in Australian technology projects might have helped to enrich the Australian change agent interviews.

## 9.6. Future directions

In the process of conducting this research, several major gaps in current knowledge were identified which need further investigation.

Firstly, according to the findings, German public and private sector companies follow Anglo-Saxon practices. It is not clear why German companies manifest themselves in the follower role. This needs further investigation. There might be a link between innovative practices and training programmes. Tidd, Bessant and Pavitt (2005) conclude that a large number of countries teach the Anglo-Saxon approaches within their organisations. They explain that there is unlikely to be one model that fits all organisations and they observe that German innovative management practices are rarely obtainable in English (Tidd, Bessant and Pavitt, 2005).

Secondly, two patterns that emerged in this study as noted in Section 7.5. indicate that there may be an influence of national culture on the role of formal and informal activities by ICT change agents within standard project management framework. These two patterns need further investigation in the cultural context by a separate thesis.

Thirdly, companies invest millions of dollars in marketing strategies to represent themselves in a positive manner and highlight their innovative practices. On the other hand, many organisations make headlines by dismissing their loyal employees. Over time, this kind of divergent diffusion strategy could lead to mistrust and a decrease in clients' interest in those companies' products and services. This assumption is based on Rogers' (1995) research which shows that a large number of studies on diffusion of innovations demonstrate that potential adopters rejected innovations because they contradicted their values. Relating to this, Rogers (1995, p. 4) concludes that:

> An important factor regarding the adoption rate of an innovation is its compatibility with the values, beliefs, and past experiences of individuals in the social system.

Consequently, there is a need to experiment with new approaches. For instance, instead of laying off their employees, companies could encourage employees who become redundant to participate in new courses which this study entitles "Winning back jobs". "Winning back jobs" courses could be offered at universities with the aim to develop employees as a new type of change agent. In this time of globalisation, research by Christensen (1997), Bridwell and Kuo (2005), Kanter (1983), Boud (1999), Kolb (1984) and Johannessen (1994) could play a vital role for the "Winning back jobs" courses. Christensen (1997, p. xv) suggests that disruptive technologies are characterised by low price and low performance in the short-term and "it was disruptive technology that precipitated the leading firms' failure". Looking at the near future by drawing on Christensen's (1997) work, this could mean that companies may face a new epoch dominated by disruptive hardware technologies coming from China. China is committed to expanding low-priced technology products (Bridwell and Kuo, 2005). As a result, companies need to train their employees to create new products and services with these disruptive technologies in order to target small market segments. Kanter (1983) observes that various employees can become change masters by acting as new entrepreneurs. In the process of development, potential change agents need to be aware of their previous practices. Boud (1999) proposes that self assessment and reflection

provide participants with a new understanding about themselves and previous events. This new understanding needs to be tested in Kolb's (1984) experiential learning cycle in order to gain knowledge about whether this practice will be suitable "... to sell the innovation to others in the organization …" (Johannessen, 1994 p. 5).

The interaction between practitioners and academics may increase the creativity of employees which in turn could lead to the development of new products and services. The innovative approaches could be sold to the previous company with the aim of gaining a new job as a change agent. It needs to be examined whether this suggestion could contribute to new organisational knowledge that is required in a knowledge-based economy.

Fourthly, in the process of acquiring new knowledge and introducing new technologies, ICT change agents and other team members suggest new ideas. As observed by Rogers (1995), multiple innovations occur within an ICT project. Diffusion and adoption and project management are distinct processes that need to be synchronised. Additional research is required to find out how to optimise these processes.

Fifthly, the study discovered that the leaders within a higher vertical structure, for example, managing directors, directors, CEOs, chiefs and projects managers, serve a dual function by acting as leaders within the organisational structure and as ICT change agents in particular project stages. This may cause ambivalence. A further examination needs to be conducted of how to fuse their mentoring training regarding leadership with the ICT change agent model presented.

Sixthly, apart from the outcome of this DBA study, in the research process, I developed a reflection model (see Figure 4) which assisted me to apply my ICT change agent experiences to this study. Further research is necessary to examine whether this model regarding the critical self-reflection process could be used by researchers to incorporate professional experiences of participants into research. By way of illustration, the research project could include two case studies. The first case study could examine how ICT change agents learn and use their work experiences without theoretical guidance.

Then, ICT change agents would need to be familiar with academic approaches towards diffusion of innovation, ICT change agents, organisational settings and ICT. In the second case study, the reflection model could be introduced and ICT change agents requested to reflect according to the model and to test their experiences by using Kolb's work (1984). As a result, they could gain two different perspectives reflected in two different voices: the first one is academic which implies the presentation of a new theory, the second one is their initial voice that they had as practitioner. Before writing the final reflection papers, ICT change agents would need to engage both voices in a dialogue to obtain more knowledge.

Finally, it seems that current technology trends and globalisation foster the rise of new types of change agents, regardless of differences in gender, nationality and religion, who will lead and change the global world on a formal and informal basis because they are able to overcome potential impediments by acting as leaders and change agents at hyper-speed. Additional research is required to investigate the emerging assumption which is meta-phrased in the words of Darwin who predicted that: "It's not the strongest or most intelligent species that survive; it is the one most adaptable to change" (Meadows-Klue, 2008).

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# APPENDIX A: PROJECT TIMETABLE

| | 2004 | 2005 | | 2006 | | 2007 | | 2008 |
|---|---|---|---|---|---|---|---|---|
| | Jul – Dec | Jan – Jun | Jul – Dec | Jan – Jun | Jul – Dec | Jan – Jun | Jul – Dec | Jan – Mar |
| **Advanced Study Units** | | | | | | | | |
| Advanced Research Methodology | | | | | | | | |
| ICT Innovation and Technological Change | | | | | | | | |
| ICT Strategy and Management of Change | | | | | | | | |
| Change Agents Strategies for ICT | | | | | | | | |
| **Research** | | | | | | | | |
| Comprehensive literature review | | | | | | | | |
| Additional literature review | | | | | | | | |
| Ethics approval | | | | | | | | |
| Pilot study | | | | | | | | |
| Confirmation of candidature presentation | | | | | | | | |
| Main study Data collection: | | | | | | | | |
| Australia | | | | | | | | |
| Germany | | | | | | | | |
| Data analysis | | | | | | | | |
| Writing | | | | | | | | |
| DBA compilation | | | | | | | | |
| DBA submission | | | | | | | | |

# APPENDIX B: GUIDING QUESTIONS USED IN THE INTERVIEW

1. What is your formal job title within your organisation?
2. How long have you worked in that position?
3. Which ICT project would you like to discuss?
4. What were the aims/ objectives of this ICT project?
5. Did this ICT project start as a pilot/ test project?
   If yes, what did you and other team members learn in the pilot project that was beneficial for the following ICT project?
6. At what stage did you get involved in the ICT project?

| | | |
|---|---|---|
| At the beginning (Initiation) | ☐ Yes | ☐ No |
| In the planning stage | ☐ Yes | ☐ No |
| In the implementation stage | ☐ Yes | ☐ No |
| In the last project stage (Close-out) | ☐ Yes | ☐ No |

   In which project stage did you undertake core work for that ICT project?
7. [Questions on that particular ICT project stage]
   a. What task/ tasks did you undertake at this project stage?
   b. Did you undertake any new tasks that you didn't perform before?
      If yes, what?
   c. Did you make any new suggestions at that project stage?
      If yes, what?
      How long did it take for your suggestions to be adopted by the target audience?
   d. Did you present/ introduce any new ICT concept(s)/ ICT application(s) at that project stage?
      If yes, what?
      If yes, how long did it take for those ICT concept(s)/ ICT application(s) to be adopted by the target audience?
   e. Did other project members present/ introduce any new ICT concept(s)/ ICT application(s)?
      If yes, what?
      If yes, how long did it take for those ICT concept(s)/ ICT application(s) to be adopted by the target audience?
   f. With whom did you work on a formal basis inside the organisation?
      [Unit/Position/Function]
   g. Did you work with anyone outside the organisation on a formal basis?
      If yes, with whom? [Unit/Position/Function]
   h. How did you communicate on a formal basis? [Face-to-face, email, internal post, external post, phone, fax, interactive software, using another person as a messenger]
   i. Did you undertake any informal tasks/ activities with the aim of moving your project work forward?
      If yes, what?
      If yes, how did you communicate on an informal basis? [Face-to-face, email, internal post, external post, phone, fax, interactive software, using another person as a messenger]
      If yes, did the informal contacts over time lead to the formation of an informal network?
      If yes, what was your function in this informal network?
   j. How long did that ICT project stage take?
8. How did the organisational settings (public/private sector settings) influence your work?
9. If you were involved in the same ICT project again, what would you do differently?
10. Looking back on the ICT project, what would you consider was the project's major achievement for the organisation?

## GLOSSARY

| | |
|---|---|
| ANZ | Australia and New Zealand Banking Group |
| APEC | Asia-Pacific Economic Cooperation |
| CB | Commerzbank |
| CBA | Commonwealth Bank of Australia |
| Change agent | An individual who initiates, manages or diffuses innovation |
| DB | Deutsche Bank |
| DBA | Doctor of Business Administration |
| Delay of ICT projects | Project outcome overruns the schedule and cost (Source: Volk, 2004) |
| DreBa | Dresdner Bank |
| External change agent | An individual who is employed outside of the organisation in which he or she is initiating, managing or diffusing the innovation |
| Failure of ICT projects | Project is cancelled before the planned completion date (Source: Volk, 2004) |
| HMD | Hessisches Ministerium der Finanzen |
| HSM | Hessisches Sozialministerium |

| | |
|---|---|
| HZD | Hessische Zentrale fuer Datenverarbeitung |
| ICT | Information and Communication Technology<br>The term ICT encompasses both communication technologies as well as IT (see IT) |
| ICT change agent | An individual who performs formal and informal roles as a prime mover of organisational ICT strategy with the aim to influence clients' ICT innovation-decisions by providing specialised innovation know-how in the ICT adoption and diffusion process |
| Internal change agent | An individual who is employed inside the organisation in which he or she is initiating, managing or diffusing the innovation |
| IT | Information Technology<br>IT refers to hardware, database, software, networks, and other devices (Source: Turban, McLean and Wetherbe, 2004 p. 19) |
| MMV | Multimedia Victoria |
| NAB | National Australia Bank |
| NSW | New South Wales |
| Process | Course of action or proceeding (Source: The Australian Pocket Oxford Dictionary) |

| | |
|---|---|
| Project | Characterised through a termination date, limited budget, objectives and resources (Source: Kerzner, 1995)<br>A project is initiated to develop or improve products, processes and/or services within an organisation (Source: Cleland and Ireland, 2002) |
| Project management | The process of managing, allocating, and timing resources to achieve a given goal in an efficient and expedient manner (Source: Badiru and Pulat, 1995 p. xiii) |
| Role | Firstly, a role is often related to "the structurally given demands (norms, expectations, taboos and responsibilities) associated with a given social position". Secondly, a role demonstrates "the actions of the individual members". Thirdly, a role is defined as "the member's orientation or conception" in terms of formal, informal, internal and external performance in different settings (Source: Hunt, 1972 pp. 29-30) |
| SRO | State Revenue Office |
| Success of ICT projects | Project is terminated on time within planned budget (Source: Volk, 2004) |
| VLA | Victoria Legal Aid |